

Flight, December 2, 1911.

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

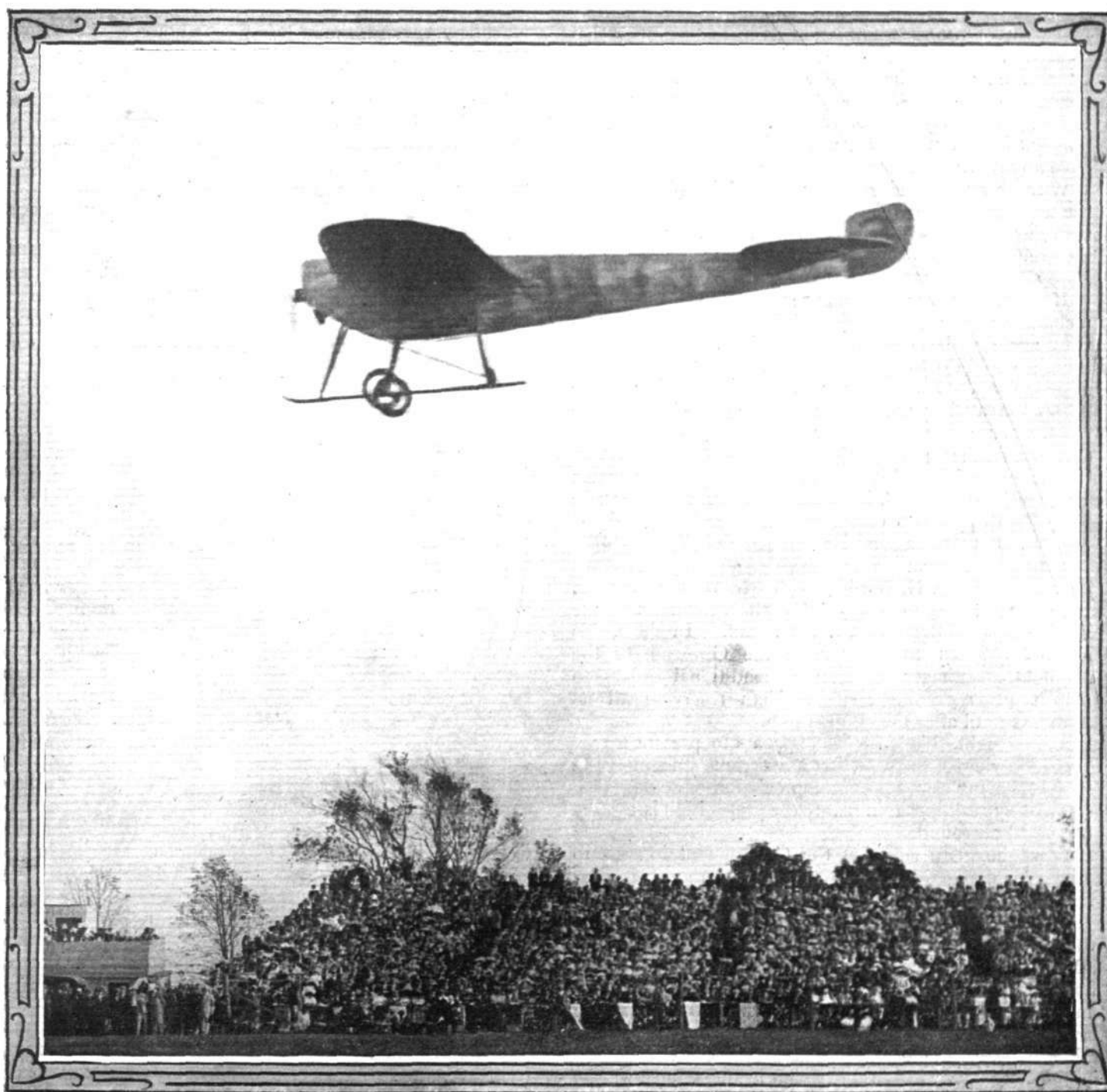
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Mr. Claude Grahame-White passing some of the stands on his 70-h.p. Nieuport monoplane at the Boston Meeting, U.S.A.

EDITORIAL COMMENT.

The Government's Great Opportunity. Do it Now!

We feel that we owe something of an apology to our readers for again taking up the text of the Government's attitude towards the British aeroplane industry. But we feel most strongly that the circumstances are such as to justify—nay, to compel—the clear setting forth of the point of view of those who are concerned with the building up of an industry which must in the time to come take its place as one of the main factors in the question of our national safety, if not our very existence itself. Before we go on to reiterate the arguments we advanced a week ago, let us say, in order that there may be no misunderstanding of the position, that we believe that the Government is really desirous of doing the right thing, and that any apparent desire to go behind our own manufacturers is due simply to a want of proper information as to the facilities that exist for the supply of all the aerial plant that is or may be required for the use of our fighting services. What measure of blame is due for the failure to properly gauge our resources is another matter. The point at the moment is that we would not have it thought that we have any unworthy motive to impute.

With this explanation in mind, and keeping in view the urgency and importance of the matter, we feel certain that our readers will extend to us their indulgence for thus returning at so short an interval to a subject that we have already discussed at some length.

If the Government acts on the resolution carried at the meeting of interested persons held at the Royal Aero Club last Tuesday week, it will be doing the best possible thing it could do for the British Aeronautical Industry and for itself. The meeting was convened to discuss the position created by the Government's proposal to institute an aeroplane competition for prizes, which event, the Government has very clearly stated, will not be restricted to machines of British manufacture, although any orders for quantity supply will, in accordance with precedent, be placed with factories established and operating in this country. There was a good deal of discussion of the different aspects of the situation, but the resolution put forward jointly by Mr. H. G. Burford with Mr. Howard Wright, and carried by the meeting, makes the vital point of the issue as clear as the proverbial pikestaff. In effect, this resolution seeks to urge upon the Government the manifold advantages of allotting conditional orders to British firms *forthwith* rather than reserving all its contracts until after the competition.

At first sight, this suggestion appears to present a very one-sided view of the case, but any serious student of the subject, having also a proper appreciation of actual facts, can readily realise that in reality the proposition is equally beneficial all round.

From the mere fact that the Government intends to organise a competition for military aeroplanes, it is clear that the capabilities required of an aeroplane for military purposes have already taken some sort of definite form in the official mind. In other words, the Government has admitted itself to be in a position to say what it wants, and therefrom to formulate a satisfactory specification for an army aeroplane on which it might invite *immediate* tenders. This is the view that, very properly, has been taken by the aforementioned meeting of those interested in the aeronautical industry, which in due course will be presented to Col. Seely by a deputation. And, from

the fact that the British manufacturers are only asking for the acceptance of their machines conditional upon their fulfilling the tests laid down in the specification, it can only be said of their request that it is extraordinarily moderate, seeing that it is made to a Government that has as yet contributed nothing tangible towards their support, whereas abroad such individual enterprise has received national recognition and encouragement from the first. Moreover, the maintenance of the British aeronautical industry is now obviously a matter of national necessity, for, however much individuals may differ in their ideas of the delights of flying as a means of locomotion, no one can any longer blink at the fact that the aeroplane has become an absolutely necessary engine of war.

No Government in England ever thinks of buying its armament from abroad—except in the form of samples for the improvement of its own productions—nor of manufacturing on its own more than a fraction of its supplies, which manufacture, by the way, is not carried on in the spirit of competition but in pursuance of a general policy. In the face of these facts, it is clearly necessary for the Government to place orders for aeroplanes with British manufacturers sooner or later, and the point that the manufacturers so strongly and so rightly emphasize is that some of those orders should, conditionally, be placed not only sooner but *NOW*.

There is justice in this, and it will, we hope, not escape the delicate sense of right and wrong that the Government claims to possess in such matters. Incidentally, the cost of acquiescing is nil, for the money is to be spent anyway, and it will not leave the exchequer at all until the nation gets what it wants.

The Government is not asked to buy aeroplanes of which it knows nothing, nor is it asked to pay for them until they actually pass the test—there is, therefore, no question of gambling with national funds. What the Government is asked to do, however, is to extend *immediately* the first portion of the support that it is bound in any case to offer in the very near future.

Manufacturers at present in the industry have a very good right to at least this amount of consideration, nor does it in the least conflict with the expressed policy of the Government in the matter of holding an international competition. Let us, by all means, find out what the foreigner can do; the more he is willing to show us the better. Nothing has yet been accomplished abroad that the Government could not secure in a British-built aeroplane constructed to a conditional order. There is, therefore, no reason whatever why the Government should wait any longer before securing machines possessed of all those qualities that present-day achievements justify as a demand.

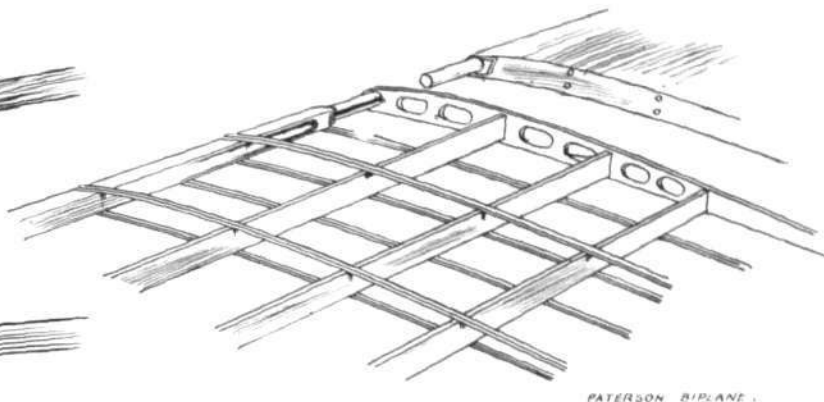
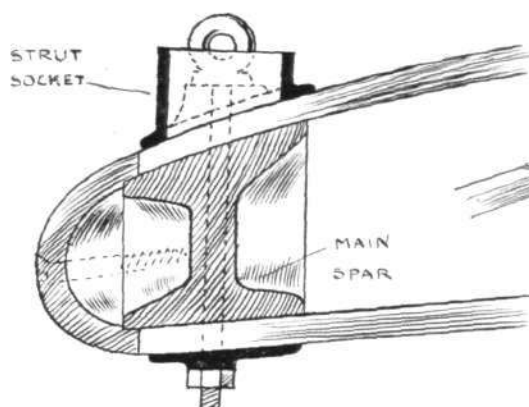
The organisation of a competition takes time—valuable time—during which the British manufacturer should be actively at work making ready to win. But he must first know the Government's requirements before he can even lay out the design, and secondly, he needs and has every right to expect a conditional order before he spends his own private money in building his nation a machine.

The situation, as was remarked in the first instance, is as clear as daylight, and to it there is only this to add—that never will the Government of this country find itself presented with a better opportunity of wiping out a long-standing stigma at no trouble and less expense.

THE PATERSON BIPLANE.

LOOKING back over the general run of biplanes, particularly those of the cellular type, constructed during the past three years, one cannot help being struck with the lack of *finesse* in design that most of them display, probably on account

necting twelve stay wires and the cable operating the *ailerons*. So easy is the whole operation that either end section can be removed by three men within 2½ minutes, and within double that time the biplane, of 32 feet span, can be got



Details of the wing construction of the Paterson Biplane.—The sketch on the left illustrates the application of the strut sockets to the built-up front spar.

of the ease of construction that characterises that class of machine.

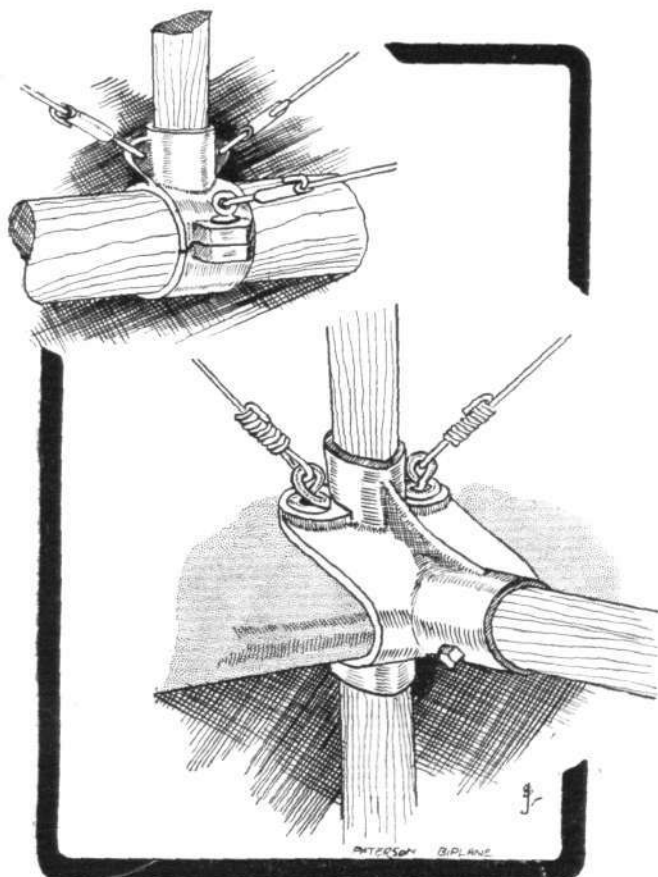
Mr. Compton-Paterson cannot be accused of erring in this respect, for, as a pilot who prefers the biplane as a mount, he has attacked the problem of construction with a view to eliminating as far as possible the shortcomings of that type. Undoubtedly the most evident bugbear of the cellular bi-

plane is its unwieldiness in transport, and to remedy this failing the *cellule* of the Paterson biplane is constructed in three sections, each of the two outer units being easily detachable from the central one by the simple process of discon-

necting twelve stay wires and the cable operating the *ailerons*. So easy is the whole operation that either end section can be removed by three men within 2½ minutes, and within double that time the biplane, of 32 feet span, can be got

ready to pass through a 10-foot gateway by the removal of both end portions. The advantages of this feature will be easily apparent to those who have had any dealings with the transport of machines of this type, and although it may seem to some an innovation, it must be said to Paterson's credit that he adopted the same system in the autumn of 1909 in the construction of the Anzani-engined Curtiss-type on which he carried out his initial experiments. The internal construction of the planes is of considerable interest, as they are double-surfaced, the fabric being supported by a well-conceived wooden skeleton, after the manner adopted in monoplane practice.

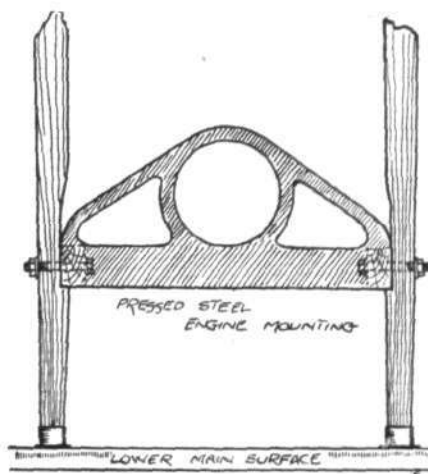
Both front and rear spars are cut from best English ash and are hollowed out to H section for the sake of lightness, excepting in those portions to which struts are applied and through which eye-bolts are passed. To the front spar is applied a hollow wooden strip, forming a nose piece, which not only strengthens the boom to a considerable extent but forms an efficient entering edge. Running parallel with the booms are three silver spruce stringers of rectangular section, that pass through corresponding mortises cut in the main ribs. In this manner the stringers may be considered as being interlaced through the wing structure, a more satis-



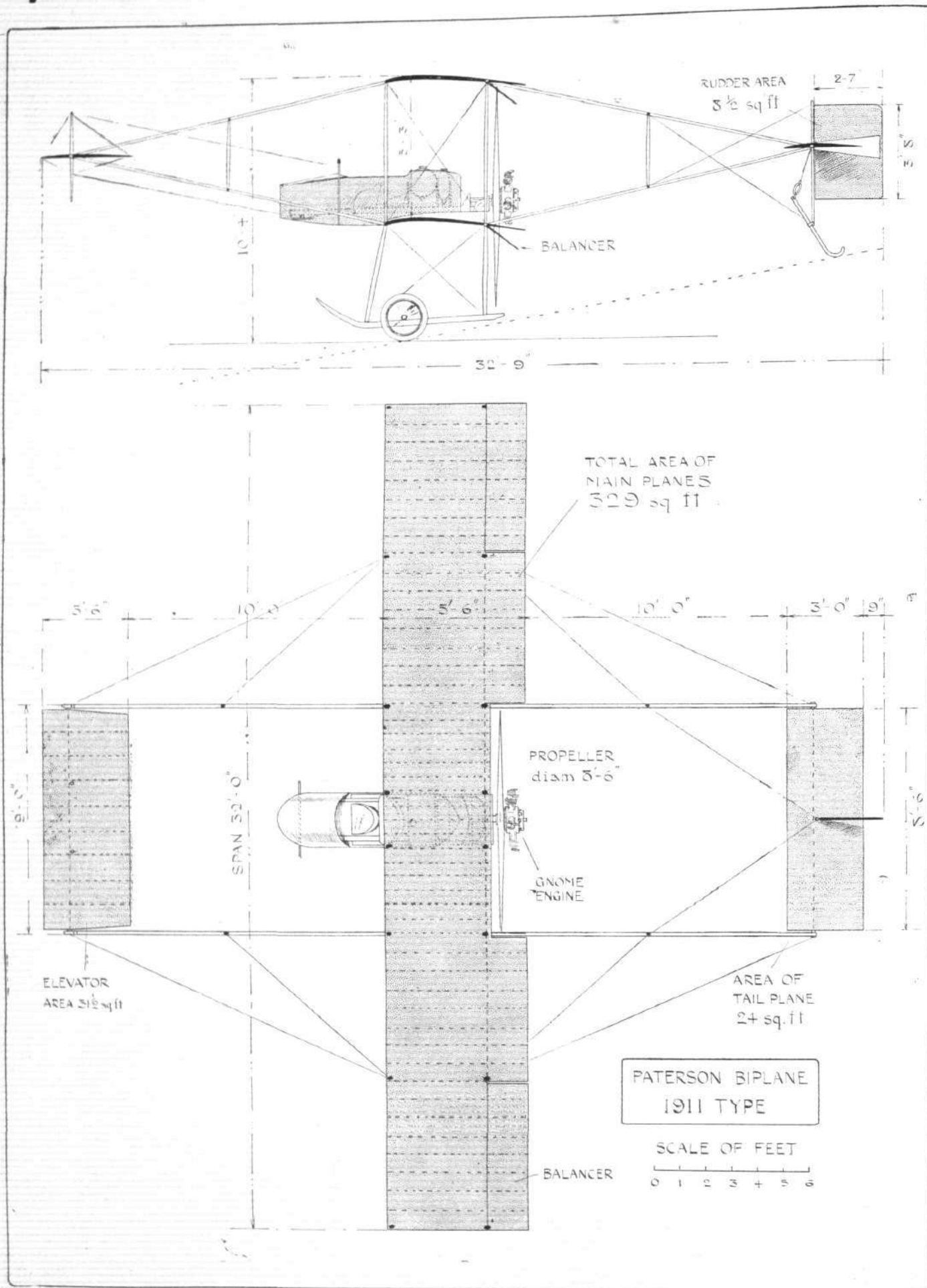
Two sketches of magnallium-bronze sockets used in the assembling of the Paterson biplane.

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Paterson Biplane.—Diagrammatic sketch of engine mounting.



THE PATERSON BIPLANE.—Elevation and plan to scale.

midway between these ribs are fitted pairs of silver spruce lath ribs which support both top and bottom surfaces. The intervals between these ribs are further divided by the application of single lath ribs which support the lower surface only. A good idea of the construction of the plane skeleton can be gathered from the accompanying sketch, and the neat workmanlike manner of accommodating the ends of the compression struts is also shown.

The method by which the end sections are rendered detachable is closely analogous to that employed in the fitting of Blériot monoplane wings. Both front and rear spars of the central section project on each side for a distance of 6 inches beyond the end of the plane. Each projection is cylindrical in form in order that it may be accurately accommodated in the large-diameter steel tube which forms the termination of the corresponding spar of the outer section. A notable feature as regards the wing construction is the fact that no tacks are used, every fastening being entrusted to either bolts or wood screws.

The outriggers, which proceed from the front and rear booms to support the elevator and tail surfaces respectively, are identical in every respect, and they are applied to the planes by means of magnalium-bronze sockets. These latter embrace three sides of the wing spar and also accommodate the vertical *cellule* struts and those struts supporting the landing carriage.

Contrary to customary practice, Paterson has not adopted a front elevator working in conjunction with a flap hinged to the rear edge of the tail, but has entrusted the function of steering in a vertical sense to a single slightly cambered surface mounted about 13 feet in advance of the main planes.

In horizontal flight this surface presents an angle of incidence slightly in excess of that of the main planes, this feature doubtless contributing to a certain extent towards the longitudinal stability of the machine. The fixed tail plane is identical with the forward elevator, both as regards size and camber, and its attitude is positively incident to the line of flight. Hinged to the tubular mast of steel, which forms the keystone in the construction of the tail unit, is the directional rudder. This organ, rectangular in shape, is constructed of sheet aluminium of light gauge supported by a thin wooden frame-work. A neat ash skid, pivoting about the base of the tubular mast before mentioned, guards the tail against damage by contact with the ground.

With the object in view of utilising the main supporting surfaces as an air brake in order to quickly bring the machine to rest after landing, the tail unit is high-built and arranged

as compactly as possible. By so raising the situation of the tail with regard to the remainder of the machine, the main planes present a large angle incident to forward advance when the rear skid is touching the ground, and so perform this secondary function of air brake. It was during his early experiments over the smooth sands at Freshfield that Paterson was first impressed by the need of quickly retarding the forward motion of the machine on landing, and although he tried all manner of frictional brakes applied to earth either directly, by means of rubbing skids, or indirectly, by braking the running wheels, the conclusion was arrived at that the system at present adopted was the most efficacious and by far the simplest from the constructional point of view.

The unit which accommodates the pilot, passenger, fuel tanks and motor has been the object of refinement in design. The front section which supports the pilot's and passenger's seats, and to which all the control wires are carried, is detachable from the rear section, to which are attached the tanks and motor, by the simple expedient of withdrawing four bolts. U-bolts have been dispensed with for assembling this unit in the *cellule*. The bearers rest on brackets shaped integrally with the four very strongly constructed central struts and are attached thereto by four bolts, one through each strut—a method which makes for ease of dismantling and facility and accuracy of re-erecting.

Almost identical with that originated by Henry Farman is the running gear with which the Paterson biplane is furnished—the only difference being that the radius rods are much shorter and consequently subject to each other a more obtuse angle at their point of attachment to the skid. They are so arranged that the wheels will have a greater "lock" for swivelling.

Control of the elevating and balancing surfaces is operated from a "gate" lever of the type first employed on the Macfie biplane and later adopted on the Grahame-White "Baby."

The customary foot-bar controls the steering laterally.

As our readers are no doubt aware the machine has been built with the object of using it for a tour of exhibition flying in South Africa. For this purpose it is exceptionally well suited as it is capable of lifting two passengers in addition to the pilot and of maintaining a speed somewhere in the neighbourhood of 50 miles an hour. For facility of transport it is quite exceptional, as the whole machine, motor included, can pack away in a case, the dimensions of which are no more than 14 ft. by 6 ft. by 8 ft. Its weight without fuel or human complement is 750 lbs.

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FORTHCOMING DISCUSSION ON THE MILITARY AEROPLANE AT THE AERONAUTICAL SOCIETY.

IN view of the all-absorbing interest of the proposed Government competition for military aeroplanes—part at least of which interest is centred in guessing the answer to the riddle, "What does the Army want?"—the discussion organised by the Aeronautical Society for next Wednesday, December 6th, has certainly been planned for the psychological moment.

On that occasion Col. Capper will open the argument by defining the principal headings of the subject and by giving his views on each, so that Major Sir Alexander Bannerman, Commandant of the Air Battalion, Capt. Burke, Capt. Broke Smith and others who have been invited to take part may similarly address their remarks towards the elucidation of certain specific points at issue.

This method of treating the subject is, at a properly conducted meeting, conducive to the extraction of the maximum amount of information in the minimum amount of time, and it makes for a lively and interesting evening instead of one of those solemn assemblies to which scientific societies are prone.

Not only is the subject matter of this opening meeting of the Aeronautical Society's winter session uncommonly appropriate, but it reflects credit on the enterprise of the Services Committee who have in hand the organisation of the Naval and Military interests within the Society. Very wisely, the Council have subdivided their labours among sectional committees of this kind, and it is to be hoped that there will be a healthy competition among the different departments to provide the best and most attractive entertainment for members by arranging for instructive and interesting discussions of this order.

Taking the particular subject in question, there is nothing on which the entire aeronautical industry feels more concerned at the present moment than to know what sort of aeroplane the Army really requires. Various manufacturers are prepared to build any-

thing that may be wanted once they can obtain some idea of what is likely to be required, and, if for this reason alone, there should certainly be a thoroughly representative gathering of members of the Aeronautical Society and their friends on this occasion. Furthermore, as the Aeronautical Society represents the engineering and scientific sides of the movement, the meeting should also be productive of words of wisdom from those who have had experience in the building of aeroplanes, and are likely to be responsible for the design and construction of such machines as will take part in the Government competition.

It is the intention of the organising committee that the discussion should be limited to the aeroplane as it exists to-day; that is to say, that it should be conducted on eminently practical lines, and not wander off into the realms of future possibilities, which may be safely left to look after themselves just for the moment. This ought to attract the engineer to the meeting for the reason that he will be able to grasp how and in what manner his own machines could be improved in the eyes of the military experts, and having regard to the fundamental importance of the military use of aeroplanes on the development of the industry, and also to the difficulty of obtaining expert military knowledge of the subject within the limits of an ordinary commercial organisation, this discussion, and others like it, should prove of the utmost value to the manufacturer. Such questions as speed, radius of action, altitude, rate of ascent, passenger accommodation, and special equipment, are all subdivisions of the main subject in which the engineer needs to know the opinion of the Army man; equally they are reasons why all and sundry should make a point of going to the Royal United Service Institution in Whitehall at 8 o'clock on Wednesday night. Those who are not members of the Aeronautical Society and who have not received special invitations must obtain a card of admission from a member.

A Study of Bird Flight

By Dr. E.H.Hankin, M.A. DSc.
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CHAPTER XXXVI.—Heat Eddies and Soarability.

IN previous chapters it has been shown that solar energy is the source of the energy of ordinary soarability. We have now to consider the question whether soarability is due to ascending currents of air caused by the heat of the sun.

On a hot day distant objects may appear to be in tremulous shimmering movement owing to the rising of masses of heated air. This effect is well known on rifle ranges in India, where it is referred to as "mirage," and is known to interfere with shooting as soon as the sun gets warm. It is also known that this shimmering appearance is more easily seen through a binocular than with the naked eye.

In investigating these "heat eddies," I found that it is preferable for the binocular to be held firmly on a stand by means of a clamp. It is advisable to direct the binocular to some horizontal white line on a building at some distance away. The object looked at should occupy the centre of the field of view. While looking at the object the head must be held steady. The slightest movement of the head or of the instrument greatly adds to the difficulty of seeing heat eddies, especially at the time of their commencement in the early morning.

In order to find out whether one phenomenon is the cause of another, it is necessary to be able to measure both of the phenomena. Then it is possible to see whether a variation of one is followed by a variation of the other. Therefore, in order to determine whether heat eddies are the cause of soarability, it is necessary to have some means of measuring these two phenomena.

The only measure of soarability available is the behaviour of cheels. In my later observations I found it advisable to observe cheels over the city rather than over the cantonment. Usually, but not always, cheels begin circling over the houses of the city a few minutes before they start over the trees and gardens of the cantonment.

A method of measuring heat eddies to some extent was furnished by the fact that they always develop in a certain order on different buildings in and near the Agra Fort when viewed from the roof of my house.

Supposing the weather is perfectly fine and undisturbed, and supposing the conditions are fully suitable for observation, the following is the sequence of events:—

1. Firstly, heat eddies appear on the edge of the roof of a small shed situated on a level with the base of the fort walls (as seen from my house). The shed is situated a few hundred yards from the fort.

2. From two minutes to a quarter of an hour after the appearance of the shed eddies, heat eddies may be seen to commence on the top of the wall of a small cemetery that is situated near the shed. The cemetery is on slightly higher ground than the shed, but the top of its wall is on a slightly lower level than the edge of the roof of the shed.

3. The next building to show eddies is the outer lower wall of the fort (near the Umar Singh Gate). These eddies are usually difficult to see, and I have not often entered the time of their appearance in my notes. There is usually an interval of several minutes between the cemetery eddies and the lower battlement eddies.

4. A few minutes later the wall of the bastion near the Umar Singh Gate appears distorted. The appearance is as if one was looking at a picture painted on canvas, and as if some one was pushing the canvas to and fro.

5. The level of the distortion of the bastion slowly rises, and a few minutes later eddies appear on the top of the bastion.

About the time that eddies appear on the lower wall or battlements, eddies also commence on a barrack building in the fort. This building is in a straight line beyond the top of the Umar Singh Gate bastion. Eddies only appear on the bastion when they have reached a certain intensity on the barrack.

As a rule, at the moment that heat eddies appear on this particular bastion in the fort, the air becomes soarable. Supposing there is no wind, then, as a rule, not a single cheel will have been visible before the appearance of the bastion eddies. Within a minute of these eddies developing eight or ten cheels may be seen circling over different parts of the city. In rare cases there may be a delay of five minutes between the development of bastion eddies and the development of soarability. On four or five occasions, while watching cheels circling at the beginning of soarability, I noticed that their flight changed from circling to flap-circling. On each of

these occasions, on turning my binocular from the city back to the bastion in the fort (a mile or two away), I found that its eddies had ceased. When a few minutes later its eddies recommenced, soarability again commenced in the air over the city.

In the presence of wind occasionally local or temporary soarability may be observed before the appearance of heat eddies on the bastion.

Thus in perfectly fine weather, and in nearly every month of the year, it is possible for me, by means of my binocular, to find out whether or not the air is soarable, and if the air is not soarable to make a guess as to how soon the change to soarability will occur.

The following are examples of my observations:—

April 19th, 1910.—7.52.—Heat eddies visible on shed.

8.19.—Heat eddies visible on cemetery.

8.40.—No cheels up.

8.42.—Heat eddies on lower battlements.

8.43.—Heat eddies visible on bastion.

8.45.—Cheels circling in city and near. Dihedrally-up position of wings noticed.

8.46.—One cheel up near Agra Club. Eighteen circling in city.

A year later a similar succession of phenomena was observed.

For instance:—

April 11th, 1911.—7.50.—Wind occasionally perceptible from west, but leaves generally still. Smoke rising and spreading out in layers. Dust haze. Eddies on shed and cemetery.

7.55.—Heat eddies slight on barrack.

8.0.—Eddies more on barrack.

8.15.—Wind coming from S.W. as shown by smoke.

8.19.—Slight eddies on bastion.

8.20.—One cheel circled and glided down up wind.

8.21.—Slight eddies on bastion.

8.22.—Four cheels circling at low level in city and two over fort.

8.24.—Nine cheels circling at low level in city and two at high level over fort. Eddies stronger on bastion.

8.26.—Seven cheels circling at low level and three at high level over city.

The following table shows the times of commencement of heat eddies and soarability, together with certain meteorological data* in different months of the year:—

Date.	Pressure.	Wind.	Temperature at 8 a.m.	Humidity at 8 a.m.	Eddies.			Soarability.
					Shed.	Ceme- tery.	Bastion.	
1910.								
Mar. 22	29.867	Calm	69.2	34	—	8.5	8.28	8.28
„ 24	29.797	„	74.2	32	8.17	8.24	8.41	8.44
April 10	29.712	W.N.W.	80.7	15	—	8.7	8.10	8.14
„ 18	29.604	S.	87.7	23	7.47	8.0	8.9	8.14
May 17	29.647	N.N.W.	89.7	23	7.22	7.34	7.52	7.58G.
„ 27	29.566	E.S.E.	92.2	45	7.4	7.7	7.9	7.9
and 7.13 and 7.14								
June 1	29.551	W.	89.2	58	7.23	7.25	7.28	7.29
Aug. 7	29.419	E.S.E.	85.2	81	7.57	7.58	7.59	8.0
„ 22	29.703	„	87.7	71	6.50	6.53	6.55	6.58
Sept. 4	29.506	W.	85.2	72	7.47	7.48	7.53	7.50
„ 26	29.738	E.	87.2	76	7.15	7.15	7.25	7.38
Oct. 11	29.856	S.E.	77.7	59	8.20	8.30	1.45	8.46
„ 27	30.001	W.	71.7	56	8.37	8.42	9.18	9.20
Nov. 13	29.976	W.N.W.	66.2	57	—	—	9.34	8.37
„ 25	30.018	W.	58.2	45	at 8.50	—	9.3	9.5
and 9.7 and 9.11								
Dec. 10	29.986	„	56.7	72	8.57	9.10	9.45	9.43
„ 30	30.109	E.S.E.	52.7	70	9.17	9.29	9.44	9.35
1911.								
Jan. 11	30.037	W.N.W.	59.2	82	at 9.20	—	9.23	9.24
„ 24	29.870	E.	59.2	85	at 8.55	—	9.0	9.1
Feb. 8	30.026	S.E.	53.2	58	at 8.45	—	8.56	8.56
„ 10	30.103	„	50.2	49	8.37	8.40	8.56	8.56
April 7	29.773	E.S.E.	78.7	28	at 8.40	—	8.10	8.7
„ 11	29.691	S.S.E.	82.2	31	at 7.50	—	8.19	8.22

* These data, except in certain cases the wind direction, are taken from official records.

The foregoing table contains a selection taken at random from a large number of observations. It serves to show that various meteorological factors, such as pressure, temperature, &c., have no influence on soarability, while the development of soarability is closely connected with the development of heat eddies. In two cases in the above table (May 27th, 1910, and November 25th, 1910) two figures are given for commencement of bastion eddies and soarability. In each of these cases eddies commenced on the bastion, and cheeks began soaring at the earlier of the two times. Then, in each case, the cheeks began flap-circling or settled, and the bastion eddies ceased. After an interval, eddies and soarability recommenced as indicated by the second entry. The letter G against the entries for May 17th, 1910, is intended to indicate that the development of soarability was gradual. It occasionally happens that soarability may be developed for a short time over a small area some minutes before its general development. This is especially the case during the monsoon season. In the case of December 10th and 30th, 1910, no true eddies, but only an appearance of distortion, could be seen on the bastion at the times stated.

The facts above described amount to a strong proof that, on the dates mentioned, there was some connection between the development of heat eddies and the development of soarability. It remains to be discussed whether this connection is casual or merely incidental.

Before entering on this discussion it will be advisable to look back at the facts already established relating to the nature of soarability. Even the earliest observations described proved definitely that soarability is not due to the bird taking advantage of irregular and chance currents of ascending air. The existence of different modes of soaring flight, the proofs that these different modes of flight require different amounts of air energy, the regularity of circling and other facts, prove that if soarability is due to ascending currents, these currents must be of small size and must be uniformly distributed in soarable air.

Existing evidence appears to show that heat eddies are of small size, and that they are uniformly distributed. Consequently, from this point of view, it is a priori possible that they are the cause of soarability.

Supposing, in the following chapters, I succeed in proving that soarability is not caused by heat eddies, then it appears to me that the idea that soarability has to do with ascending currents (in the ordinary sense of the word) must be regarded as negative in the present state of knowledge. If one set of air currents, small in size and uniformly distributed, are not the cause of soarability, it becomes a very rash assumption that there is another set of ascending currents, also of small size and also uniformly distributed, that are the cause of soarability.

CHAPTER XXXVII.—Heat Eddies not the cause of Soarability.

It is safe to assume that the heat eddies described in the preceding chapter are caused by the heat of the sun. They may, therefore, be more particularly described as "sun eddies." Two other kinds of heat eddies are known to me, which are not directly caused by the heat of the sun, and which have no relation to soarability. These I propose now to describe.

Though I have made no systematic observations on the point, I have, on several occasions, noticed that there is a decrease in the intensity of sun eddies during the afternoon as soarability decreases. But towards sunset there is a fall in the temperature of the air. It therefore becomes cold relatively to the earth. Hence (in hot weather) buildings which have accumulated sun heat during the day begin, at this time, to warm the air in contact with them. Heat eddies are therefore produced. These heat eddies may be called "earth eddies." They often are stronger than the sun eddies observed at the commencement of soarability. They develop and acquire intensity at a time when soarability near the earth is decreasing. For instance:—

23rd March, 1910.—4.45.—Air at low level still soarable.

5.0.—Eddies slight on cemetery and bastion. None on Taj. Slight on Taj Mosque and Taj Garden Kiosk.

5.9.—Air at low level unsoarable. No heat eddies on bastion shed or cemetery.

5.50.—Strong earth eddies on Taj Mosque, Taj, Taj Garden Kiosk, and on Jawab (a building which was then in shadow of the Taj dome).

When the weather is hot these earth eddies appear to persist all night, since in the early morning they may be seen over all the larger buildings as soon as there is enough light for them to be visible. As the sun gathers strength they die away. Some time later sun eddies begin, and are followed, as previously described, by the development of soarability. I have seen these earth eddies in the early morning, over all the buildings of the fort, as strongly marked as are sun eddies an hour after soarability has been established. Nevertheless, there was no sign of soarability. A few cheeks occasionally in the air in the fort were all in flapping flight.

Another kind of heat eddies may be described as "air eddies," as they are produced by a current of cold air striking the heated surface of the earth. If a dust-storm is followed by rain, it may produce a fall of temperature. Dust storms, in which the wind feels cold, may produce "air eddies." This may happen in cases in which the air is probably not soarable. For instance:—

April 21st, 1910.—9.30 to 10 p.m.—A dust-storm came up from the west. Lightning in the distance. Air eddies were seen on the upper and windward side of the moon, which was nearly full. The eddies were only visible as the dust was clearing off, and then were not continuous. Later, when the storm had cleared off, but wind was still blowing, no eddies were visible on the moon.

I have seen air eddies over the fort buildings in front of an advancing rain-storm, which continued when the buildings were under heavy rain, and were visible for three or four minutes under these conditions. On one occasion (July 29th, 1910) I noticed that these air eddies (formed near rain-showers) seemed to differ from sun eddies, in that they were visible on vertical as much as on horizontal lines of buildings. Also they seemed more fine-grained. The air was unsoarable.

Sun eddies and earth eddies, though different in origin, are when formed one and the same. They merely differ because I have given them different names. The presence of earth eddies does not cause soarability. Therefore the presence of sun eddies, *per se*, does not cause soarability. So far as the evidence, at present brought forward, goes, it might be thought that sun eddies differ in some unknown way from earth eddies, and that this unknown difference enables the sun eddies to produce soarability.

But I have now to bring forward evidence to show that in the presence of thin cloud, soarability may develop at the normal time in the morning in the complete absence of any trace of heat eddies. The evidence suggests even that the energy that produces soarability can penetrate thin cloud more easily than the energy that produces heat eddies. The following are examples of this occurrence, which, it may be noted, have been recorded at different seasons of the year:—

Date.	Pressure.	Wind.	Temperature, 8 a.m.	Humidity.	Soarability began at	Remarks.
1910.						
June 22	29.588	S.	90.2	50	7.51	Patches of cloud, slight eddies on shed
July 22	29.621	W.N.W.	91.2	56	7.40	Glare, no eddies; soarability developed gradually
Aug. 9	29.457	N.E.	87.2	74	6.55	Thin cloud, no eddies
" 12	29.411	W.S.W.	81.2	87	8.6	Glare, no eddies
" 13	29.458	S.S.E.	81.2	81	7.55	"
" 26	29.659	E.	81.7	89	7.20	"
" 27	29.659	W.	81.2	91	8.20	"
Sept. 7	29.434	W.N.W.	79.2	91	8.0	" Similar results on three following days
Nov. 9	29.944	E.S.E.	69.2	70	9.4	Glare, no eddies
Dec. 23	30.080	W.N.W.	47.7	49	10.5	Cloud, no eddies
1911.						
Jan. 8	30.157	Calm	54.7	90	9.33	"
" 9	30.143	"	59.7	85	9.30	"
April 9	29.736	W.N.W.	80.2	37	7.55	No cloud, but sunshine dim from dust in air at high level. Eddies on shed and cemetery, none on bastion

In many of the above instances an increase of glare was apparent at the time when soarability developed. In these cases in which the sky is obscured by thin cloud and a strong glare of light is present, there is no noticeable delay in the time of development of soarability. In other cases in which the sun is obscured by heavy cloud, the development of soarability may be delayed until the sun comes out. If the sun comes out suddenly then soarability develops suddenly. If, on the other hand, the clouds dissolve gradually, then soarability will develop gradually.

It might be objected that in the above instances heat eddies developed but were not visible owing to bad light. But cases are known to me in which eddies are visible under cloud shadow. For instance, in the following striking case, eddies, in the early morning, were visible under cloud shadow without soarability. The eddies gradually diminished and vanished, and after they had gone the air became soarable to a slight degree:—

September 21st, 1910.—At 6.45.—Cloud in two layers. The lower layer moving slowly from north. Wind cold, puffy, moving small branches. No sunshine or glare. Strong eddies on

Students' Hostel, Sekundra, cemetery, shed, bastion, barracks and city houses. No cheels up.

7.0.—Eddies as before. No glare. No cheels up, except cheels in ascending current over Delhi Gate of Fort. These were gliding at low level.

7.15.—Eddies on hostel slight. Sekundra, no eddies, but it appeared as if out of focus. Strong eddies on city houses, slight on bastion. Strong on barracks. Slight on cemetery. Shed appeared as if in bad focus.

7.20.—No sun. No glare.

7.30.—No cheels up. Slight eddies on hostel, city houses, barracks. None on Sekundra, bastion, shed, or cemetery. Glare.

7.45.—Eddies on hostel, and slight on barracks. None on city houses, Sekundra, shed, cemetery, or bastion. No cheels up.

8.5.—No eddies anywhere.

8.7.—Five cheels circling at low level in far part of the city; they appear to be in strong glare or sunshine.

8.16.—Five cheels circling and two skimming over buildings.

8.20.—No cheels up. No eddies. Glare.

8.25.—Eight cheels flap-circling.

9.30.—Cheels lee-looping.

10.0.—Thin cirrus over sun. No eddies, except on hostel. Cheels and scavengers circling both at low and high levels. No flex-gliding. Cheels flapping for going up wind.

10.3.—Two cheels seen flex-gliding, and one scavenger flex-gliding with loss of height and then flap-gliding.

During the monsoon season (as seen both in 1910 and 1911) it is exceptional for there to be any relation between bastion eddies and soarability. But, as will be described in a later chapter, on many occasions during the monsoon season, when no eddies were visible, there is reason for believing that sun energy was the source of the soarability observed.

Thus all attempts to prove that sun soarability is due to moving masses of air have so far failed. So far as the evidence goes, it appears that when air is fully soarable, every minute portion of it is as ready to furnish energy for soaring flight as any other portion. If soaring birds get energy from the air by meeting eddies (of unknown nature), and extinguishing their motion, then these eddies must not only be uniformly distributed, but also must be of very minute size. Another suggestion is possible, namely, that soarable air contains unstable modification or compound that decomposes with explosive violence when in contact with the underside of a vulture's wing. This is not a view to be lightly dismissed or lightly accepted. On the other hand the view that it is legitimate to assume the existence of an unknown ascending current to explain every movement of the soaring bird is a view that has led to no new discoveries, and that has discouraged research in a direction that promises to be of interest from several different aspects.

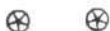
(To be continued.)



AN ARMY AIR BATTALION RESERVE.

A SPECIAL Army Order issued on the 24th ult. states that with a view to forming a reserve for the expansion of the Army Air Battalion on mobilization, a number of officers of the Regular Army will be selected as suitable for Army aviation work.

An officer desirous of being selected must have not less than two years' service, be medically fit, and be recommended by his commanding officer. If he is not in possession of a pilot's certificate he must obtain one at his own expense. Preference will be given to unmarried officers, and married officers will only be considered in exceptional cases.



AIR SCOUTING COURSE ON T.S. "MERCURY."

ON Monday last the special course of instruction in aeronautics which Mr. C. B. Fry, Hon. Director of the T.S. "Mercury," has arranged for his boys was inaugurated. This course forms part of the scheme lately evolved by the Young Aerial League (227, Strand, London, W.C.) to give boy scouts a simplified aeronautical training which would enable them to identify machines, estimate their height, speed, direction of flight, &c., thus enabling them to be of immediate service to their country in case of invasion. The knowledge the scouts will acquire will also help them to qualify rapidly and surely for their airman's badge.

The "Mercury" boys are very keen to study the new science, and

An officer selected for Army aviation work will be paid under instructions from the War Office a reward of £75 if he is in possession of a pilot's certificate, or after he has obtained one.

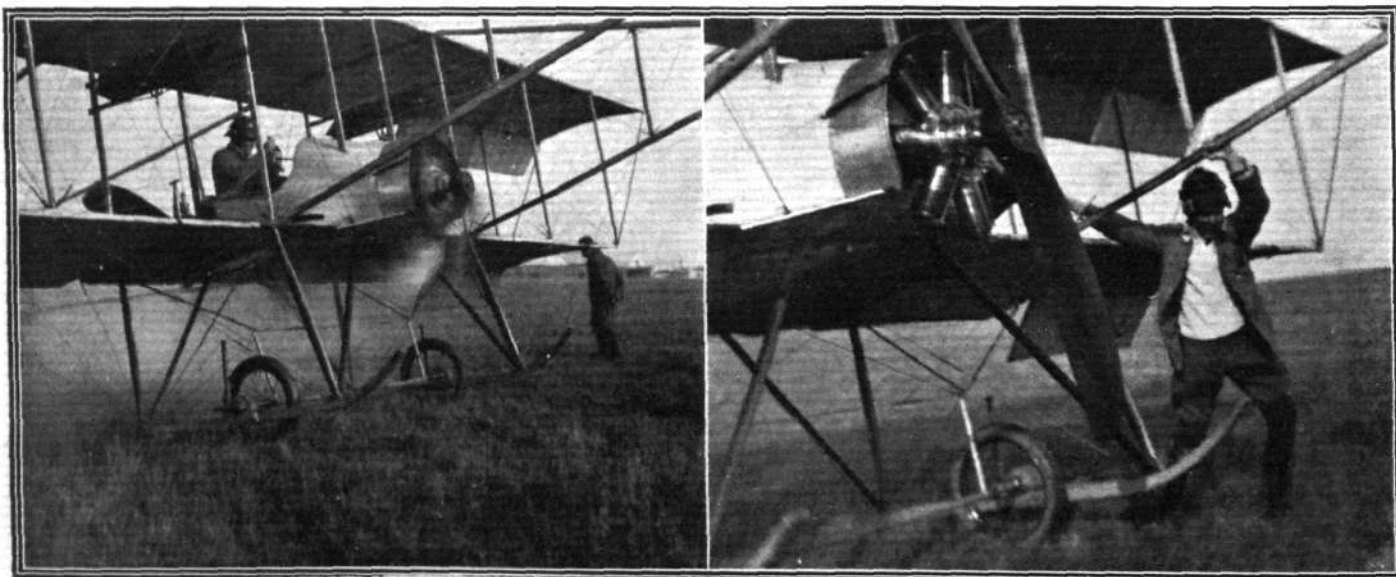
An officer so selected will be required to undergo a further test to be arranged by the Commandant, Air Battalion, after a short course in the Army Air School, in order to qualify for a certificate as Army aviator.

Applications for selection will be transmitted through General Officers Commanding-in-Chief to the War Office.



are fully aware of the value which a sound aeronautical training will be to future sailors.

Mr. Blin Desbleds, lecturer in aeronautical engineering at the Polytechnic, London, who gave the inaugural address, dealt especially with the different ways in which the new means of locomotion is likely to affect the Navy. He concluded his address by saying that the time was fast approaching when a new field of activity would be opened for sailors with aeronautical knowledge. The "Mercury" boys should consider themselves very fortunate to be the first to have an opportunity of acquiring some aeronautical knowledge in addition to their usual naval training, for they would be more valuable to the Navy than ordinary sailors, and would consequently be entitled to greater considerations.



MR. FRANK McCLEAN AND HIS SHORT TANDEM TWIN-ENGINE MACHINE.—On the left just starting away from the Eastchurch grounds, with Lieut. Samson as passenger, and on the right Mr. McClean helping to store his machine after his first flight on it.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Flying Ground, Eastchurch.

ON Monday last week a general ground fog prevailed throughout the island for the greater part of the day, it not being sufficiently thick, however, to prevent flying, which was started at about 8 a.m. by Lieut. Samson on the Blériot. He was followed by Capt. Gerrard and Lieut. Longmore, who made several long flights on the twin-engine biplanes, this being the first time they have actually piloted these machines.

Tuesday saw a great improvement in the weather, the day being bright and cheerful, although a good steady wind prevailed all day. Lieut. Samson was again out on the Blériot, and at the same time Lieut. Dunne was flying his automatic stability machine, making several flights which showed a great advance in the capabilities of the machine, which now gets into the air quite easily and flies very steadily.

In the afternoon an interesting race was arranged between Capt. Gerrard on the Short tandem-twin, and Lieut. Longmore on the triple-propeller twin-engine machine. The course was to Leysdown and back, and was to test the relative speed of the machines. The test was not quite conclusive, owing to Gerrard rounding a different point to Longmore, but there was a slight advantage in favour of the triple-propeller machine, which completed the run at slightly over 50 m.p.h. Afterwards, Lieut. Longmore made his first flights on the Blériot, handling the machine with considerable skill, and making six or eight short flights during his first two-hours' experience of the machine.

Lieut. Samson took up the triple-twin-engine machine, and made, as his first experience of piloting the machine, a splendid flight lasting 40 mins., during which he rose to a great height, and flying against a beautiful clear sky formed a picture which will long be remembered by those who witnessed it.

The finish of this flight was noteworthy, as giving a practical illustration of the advantages of having two engines. When over Brambledown, about 4 miles from Eastchurch, at a height of some 600 ft., the magneto of the back engine became loose and worked out of gear, upsetting the tuning, and causing the engine to stop suddenly.

Being used to one engine, Lieut. Samson, on hearing the noise of the gears out of order, instantly prepared for a *vol plané*, and scanned the ground for a field to land in. Such a course, however, was not necessary, for the machine continued to fly well with one engine, and descending at a very gentle angle, Lieut. Samson landed safely in the aerodrome, having plenty of room for a turn in order to alight close to the shed.

On Sunday, Mr. Travers, who is to instruct the Territorial Balloon Company in the art of flying, was out testing the new 70-h.p. Gnome-engined Short biplane which has been specially prepared for their instruction.

On Monday, Mr. F. McClean was out on the twin-engine machine with Mr. Alec Ogilvie as passenger, and later Mr. Ogilvie again went up with Captain Gerrard. Lieut. Longmore put in some fine practice on the Blériot monoplane, which he now handles very skilfully. In the afternoon, Captain Payne, R.N., made a long cross-country tour in the Short triple-propeller twin-engine machine, being piloted by Capt. Gerrard.

Barrhead Aerodrome.

WIND all through the past week has put a stop to outside practice, but work in the shops has gone on at a great pace. A little rolling has been put in by pupils on such evenings as the wind permitted.

On Saturday, R. W. Philpott, the school instructor, was just trying the Caledonia before handing over to pupils, when a cylinder flew off, narrowly missing his head. He was able

to accomplish a safe landing, and a new engine—a 35-h.p. J.A.P.—is now being fitted.

Mr. A. E. Pickard, a notable Glasgow music hall proprietor, has offered a prize of £20 to the first aviator who, flying from outside Glasgow, lands on Glasgow Green, the only stipulation being that the flight must be accomplished on a Scottish-built aeroplane.

Brighton-Shoreham Aerodrome.

ON Sunday at mid-day Lieut. J. C. Porte brought out the two-seater Deperdussin monoplane, although there was a fairly stiff breeze blowing, and made a four-mile circuit in splendid style, once more demonstrating its great steadiness in tricky weather and its suitability for passenger work.

In the Chanter school, on Sunday, Gassler made straight flights and De Villiers put in some good rolling practice.

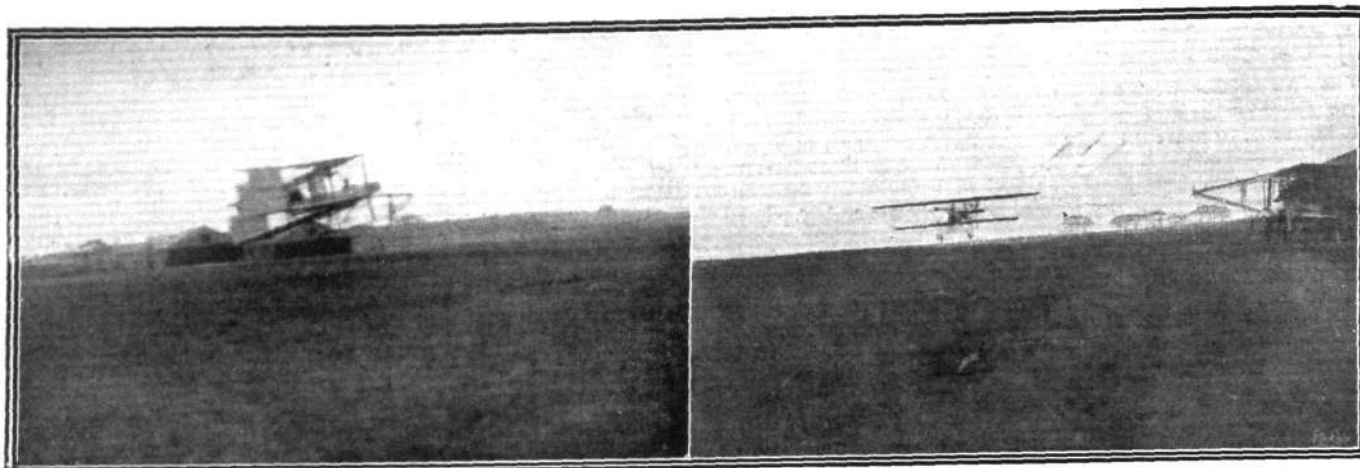
Tuesday saw the Deperdussin out again, Lieut. Porte making a solo trip to Brighton and back about mid-day and a couple of circuits with Mr. G. Hill, of Brighton, as passenger during the afternoon.

Brooklands Aerodrome.

ON Wednesday last week Chataway started out on the Deperdussin *brevet* machine for his ticket, but unfortunately broke his front skid. Bell was up on the 35-h.p. Deperdussin, whilst Spencer and his pupil were also flying. A. Dukinfield-Jones, who obtained his ticket on an Anzani-Blériot at the Liverpool Aerodrome, and who has now joined Flanders, whilst indulging in some straight flights, pancaked and broke a wheel-base strut, which, however, was quickly repaired. Raynham was first out on the Viale-Avro, and later on the Green-Avro, Snowden-Smith, Ducocq, and Blondeau were all at work carrying passengers, the latter taking Mrs. Hewlett. Sopwith flew the new Martin-Handasyde, which was going well, but in landing somewhat unevenly, the wheel-base was carried away. Happily no other serious damage was done. Shortly afterwards Sassoon, who had been flying circuits on the Big Bat, and was finishing a *vol plané*, apparently "landed" about 25 feet from the ground. Switching on too late, he pancaked and broke the propeller. The machine bounced an enormous height in the air, and on returning to earth broke its landing chassis and then stood on its head, spinning round on the stump of the propeller. The pilot, luckily, escaped without injury. Kemp took out the Vickers, and subsequently the Flanders, with W. O. Manning as passenger. On landing one of the tyres burst, causing the wheel to buckle under the additional strain. Among the Bristol school,



A GROUP OF PIONEERS AT THE R.A.C.'S EASTCHURCH FLYING GROUNDS.—On the left are Mr. Frank McClean and Lieut. H. V. Gerrard, who had just returned from a flight to Sheerness on the Short twin-engined biplane, it being Lieut. Gerrard's first flight. Next is Capt. Gerrard, R.M.L.I., Lieut. Samson, R.N., and Lieut. Gregory, R.N.



Lieut. Dunne is seen in the left-hand view making a low flight at Eastchurch on his biplane. On the right Mr. McClean just alighting after a flight on the Short twin-engined machine.

Fleming was first out, testing, afterwards taking up Warren as passenger; whilst Gordon did two sets of two figures of eight, and Benwell flew two circuits. In the afternoon Gordon made two circuits in rather a gusty wind, which got up after a perfectly calm morning. Pizey then went out on No. 65, which had just been fitted with new plugs.

Thursday, Friday, and Saturday were all blank days owing to the bad weather.

Sunday for most of the day also proved bad, but Pizey and Gordon ventured out over Weybridge for a quarter-of-an-hour flight. Gordon put in some figures of 8, and Pizey carried as passengers, Longcroft, Capt. Raleigh, and Gibson. Lawrence indulged in some straight flights, and Kemp on the Flanders did four circuits.

On Monday there was a dead calm, but owing to the fog little was doing, only Bristols and the Flanders being out. The latter was taken up by A. Dukinfield-Jones, who lost his bearings in the fog, and, when skimming over the grass, found himself confronted by the fence round the aerodrome, over which he jumped in the hope of landing on the track. This he failed to do, probably owing to the fact that he has had practically no practice on this machine before, landing on the road to the paddock, with a bump which buckled the wheels, broke several struts, one wing-tip, and the propeller. Considering the force of the landing and the rough condition of the ground, remarkably little damage was done. The machine is now being dismantled completely for a thorough overhaul. Pizey went out on the Bristol with Longcroft, and Gordon was doing circuits. Then Fleming, with Longcroft holding lever, took a turn, and Gordon did half the tests for his certificate, flying beautifully. In the afternoon, Fleming climbed to 1,200 ft., and finished off with a fine spiral *vol plané*. Pizey followed suit with Garne, getting up to 1,300 ft. Kemp was at work again on the Vickers, putting in circuits at a good altitude in excellent style.

On Tuesday Pizey took up Garne, Fleming carried Longcroft, and Gordon was flying circuits in the afternoon. Sopwith gave the repaired Martin-Handasyde a bit of a spin over two circuits, whilst Hitchcock was out on the Spencer, and Raynham on the Viale-Avro.

Filton (Bristol) Flying Ground.

MR. HOTCHKISS was testing a Bristol biplane on Saturday last, bought by Lieut. Harford for use in India. He found it to be working perfectly.

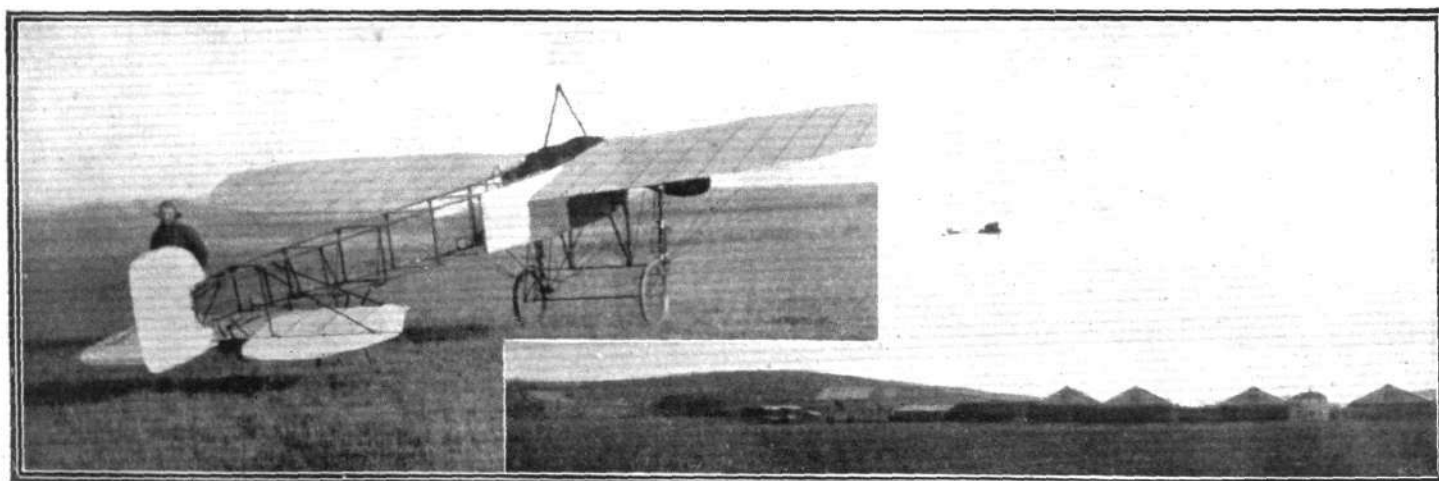
London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—The weather was more or less favourable on the Wednesday of last week, and this enabled Fowler to take out the school Farman in the early morning and indulge in a spell of practice. During the afternoon R. T. Gates used the Gnome-Farman for about half an hour, making straight and semi-circular flights from one end of the aerodrome to the other.

No further field work was done until the 27th, when Fowler resumed his practising on the school Farman, making straight flights and landing well.

From this date idleness, as far as practical flying was concerned, was enforced, owing to the fog, wind and bad weather generally. However, on Wednesday morning both Fowler and Raphaite had control of one of the instruction machines, and both performed short flights.

Valkyrie School.—On Wednesday last week the fog having cleared off during the morning, the school pilot made a trial flight on the school machine, before allowing pupils to go out. He completed several circuits, and terminated the flight with a nice *vol plané*, with engine completely stopped. Busk, the latest pupil to join the Valkyrie School, then mounted the machine and got half-an-hour's practice, making several successful flights. Meantime, Mr. Barber ascended on the Valkyrie racer, and for twenty minutes carried out many effective evolutions in the air, finally landing with a clever spiral descent. Capt. Loraine immediately set out on the Gnome-Valkyrie No. 10, and put up a really attractive exhibition, including numerous spiral *vol planés* and sharp turns. Having been in the air for half an hour, he terminated his flight with a long glide, landing perfectly in front of the hangars. Later, the wind increased considerably, and during the remainder of the week wind and fog held sway alternately.



LIEUT. SAMSON, R.N., AND HIS BLÉRIOT AT THE R.Ae.C.'S EASTCHURCH GROUNDS.—On the right Lieut. Samson is making circuits on the machine.

Salisbury Plain.

Air Battalion.—Although the wind was somewhat treacherous on Wednesday of last week, Lieuts. Reynolds and Conner were out on a Bristol Military biplane, while Lieut. Manisty, who learnt the art of flying on a Hanriot at Brooklands, was making trial flights on a biplane. On Thursday and Friday the weather was too rough to permit of any flying, but on Saturday Lieut. Hinds was testing the Renault engine fitted to his Breguet biplane. During these three days a good deal of work was put in erecting machines in the hangars. Monday was a busy day for the Air Battalion, and in the morning Mr. Prier took up Lieut. Reynolds on the Bristol two-seater monoplane. Lieut. Reynolds was so impressed with this flight that it would not be surprising to hear he had decided to forsake the biplane for the monoplane. Lieut. Hinds, after finishing the tuning up of his engine, brought out the Breguet machine and made a couple of short flights. Lieut. Reynolds had one of the re-erected biplanes out for a trial run, but it requires a good deal more tuning up. An unexpected visitor arrived shortly after half-past three, a biplane being observed flying at a height of 800 ft. After making a circle of the Farge and Larkhill Camps the machine settled down in front of the Air Battalion hangars, and Mr. S. F. Cody proved to be the pilot, accompanied by Lieut. Parke, R.N., they having flown over from Farnborough. After spending about 20 mins. chatting with the officers of the Air Battalion and instructors of the Bristol school, Mr. Cody with his passenger remounted the machine, and, taking off, rose to a height of 400 ft. A pretty sight was seen in the afternoon, when all the machines at the school were brought out and lined up for inspection. Lieut. Manisty, who is attached to the Air Battalion, had one of the Bristol biplanes out, and in landing only just escaped running into the wire fence.

Bristol School.—The conditions were anything but favourable on Monday last week in the morning, and flying was, therefore, not attempted. In the afternoon, however, Jullerot was first up, and, after making a trial on No. 66, school work was started off by Mr. Smith-Barry making two solo flights in good style, as also did Mr. Dacre. Busted ascended with Lieut. Borton, a new pupil, as passenger, completing several circuits and remaining up for 25 minutes. The wind had by this time increased in velocity, and further outdoor work had to be abandoned.

Tuesday saw Busted out making a trial, followed closely by Jullerot. They found the weather fairly favourable, and school work was immediately proceeded with. Jullerot took Lieut. Borton for a flight, this pupil also being carried by Busted, and Messrs. Smith-Barry and Dacre each made two solo flights, performing with excellent skill and judgment. Lieut. Head also went up for a flight, and, after completing a circuit, landed in fine style.

In the afternoon Prier gave an excellent exhibition on the new monoplane. After making three long flights, he took Capt. Fulton and M. Grandseigne as passengers. Fine examples of the proficient state of the pupils was then given by Lieut. Head, Mr. Dacre and Mr. Smith-Barry each going up for solo flights and executing figures of eight, finishing with *vol planés* from good altitudes. Pixton took up Lieuts. Porter and Borton for passenger flights.

Pixton was out early on Wednesday ascertaining conditions, afterwards having Lieuts. Porter and Borton as passengers. Mr. Smith-Barry was up for a high flight, as was Mr. Dacre. At 11.30 Mr. Smith-Barry started for a cross-country flight. At 2.30, after Jullerot had made a trial, he ascended with Lieut. Borton as passenger. Busted took Lieut. Porter for two tuition flights, and Pixton, Lieut. Borton. Messrs. Smith-Barry and Dacre then

passed the tests for their certificates in creditable style, being observed by Lieut. Reynolds and Lieut. Wyness Stuart.

The wind had complete mastery of the situation on Thursday, there being very little improvement next day from an aviator's point of view, the wind being rather puffy; however, in the evening Busted, after making a trial, ascended with Lieut. Borton for a flight.

Outdoor work was not attempted on Saturday morning, but towards evening Prier ascended on the new monoplane, having Mr. Valentine as passenger, and made two circuits. The wind was blowing "big guns" the whole while, but Mr. Valentine, upon landing, declared that the machine had been flying as steadily as if in a dead calm.

Flying was commenced early on Sunday, Jullerot being first out on No. 43, with Mr. Farnell Thurston as passenger. Mr. Valentine went up for a flight of half an hour on the two-seater, reaching a height of 2,000 feet, and Lieut. Joseph made a solo flight of a quarter of an hour in good style on No. 43, whilst Jullerot took Lieut. Borton and Lieut. Porter for tuition flights.

In the afternoon Mr. Valentine was out on the monoplane, flying over Amesbury at a good height, and landing after half an hour. Jullerot was giving tuition flights to Lieut. Porter, as also was Busted. Lieut. Bowers was then sent up for his certificate, observed by Mr. Valentine and Mr. Farnell Thurston. He passed the whole of his tests in fine style.

Monday morning gave promise of plenty of flying, which was amply fulfilled during the day, 30 flights being made, and no fewer than five machines being in the air at the same time. Jullerot was, as usual, on a Bristol making a trial, after which he took Lieut. McArthur for two tuition flights. Mr. Pixton was also giving instructional flights to Lieuts. Porter and Borton, as well as having Mr. Farnell Thurston as passenger. Busted was next away with Lieut. Borton and then with Lieut. McArthur, whilst Lieut. Freeman performed two solo flights in fine style. At 10 a.m. Busted ascended with Lieut. Borton as passenger to instruct him in *vol plané* work, and after switching off several times, landed with a spiral from 1,000 ft. Mr. Valentine meanwhile was up on the new Bristol monoplane, having Lieut. Reynolds, R.E., as passenger. Both expressed their delight at the stability of the machine and with the efficiency of construction of its landing chassis, as evidenced by the lightness with which it came to earth. Prier then took a new two-seater monoplane for her maiden trip, the machine having been assembled on the Plain. He found her in splendid order, showing an even better turn of speed than her prototype. This machine was then taken in hand by Mr. Valentine, who again had Lieut. Reynolds as passenger. They made wide circuits at about 2,000 ft., remaining aloft for half an hour. A fine spectacle was then afforded by Jullerot, Busted, and Pixton on biplanes, with Mr. Valentine and Prier on monoplanes, all taking the air at the same time.

Things were again very busy as the afternoon wore on. Lieut. Williamson, passing the necessary tests for the second part of his certificate, observed by Lieuts. Reynolds and Stuart, thus being the fourth Bristol pupil to qualify for the certificate this week, and the eighth for the month, which, as *FLIGHT* readers are well aware, has been affected with very adverse flying weather. Jullerot was away on No. 66, climbing to 1,200 feet, afterwards giving Lieut. Porter a lesson on the same machine. Pixton made ascents with Lieut. Porter and Mrs. Williamson, Busted having Lieut. Borton as his passenger.

Mr. Valentine followed with a good flight on the new monoplane, Jullerot being passenger, he afterwards giving his mechanic a trip.

THE FRENCH LAW OF THE AIR.

THE first really serious attempt to frame legislation for controlling aerial navigation has just borne fruit in the publication of a set of rules of the air in the form of a decree of the French Minister of Public Works. This provides that owners of any aerial machine or apparatus, whether aeroplane, airship, or free balloon, must obtain a permit from the Prefect of the district as well as a navigation licence, the latter being obtained from the Department of Mines, for the purpose of identification. The licence must bear a photograph of the machine to which it refers, as well as full particulars of it and the owner. All machines must bear number-plates similar to those used on motor cars, but, bearing in mind the international touring passes, in the number-plates of machines belonging to French subjects, foreign subjects domiciled in France, or foreign firms having offices in France, a large "F" will be included in the sign. Landings are only to be permitted on grounds specially set apart by Municipalities, and aerial machines may be prohibited from passing over certain places after an order has been obtained from the Government. Foreign military machines will not be allowed to fly in France without special permission, and provision is made for special regulations to be applied to public service machines. Explosives, arms, or war munitions, carrier pigeons, cameras, or wireless telegraphy apparatus may only be carried providing

special permits have been obtained. It is incumbent upon the pilot to keep a proper log book, containing full particulars of the doings of the machine, and these books must be kept for two years after the last entry. Dirigibles will be required to carry three lights, a white one in front visible for four kilometres, a green one at the right side, and a red one at the left side, the latter two being visible for a distance of two kilometres. This regulation is also applicable to aeroplanes; but, in view of possible difficulties, they will not be insisted upon at first. It is suggested that a single lantern might be fixed on aeroplanes showing green to the right and red to the left. Free balloons have to carry a single white light. Dirigibles and free balloons are also to be provided with a horn or similar warning instrument, but it is not proposed that this regulation should apply to aeroplanes, at any rate at first. With regard to passing, the regulations provide that dirigible and aeroplanes shall give way to free balloons, and no machine should pass another within a distance of 100 metres in any plane. On preparing to land, a dirigible must fly a triangular red flag beneath the *nacelle*; and should a dirigible make an involuntary stop it will display a large black ball, while if the stop has been caused by bad weather two black balls will be shown, and if it is in distress the red flag will be put out in addition. An oscillating white light has to do duty for most of these signals at night.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE ANNUAL DINNER will take place at the ROYAL AUTOMOBILE CLUB, Pall Mall, S.W. (by kind permission), on **THURSDAY, DECEMBER 14th, 1911**, at 7.30 for 8 o'clock.

In order to facilitate the arrangements, members are requested to notify the Secretary, as early as possible, if it is their intention to be present.

Members may be accompanied by ladies.

Tickets (inclusive of wines, cigars, &c.): Gentlemen, £1 5s.; ladies, £1 1s.

The following prizes won during the year will be presented:—

The Manville £500 Prize ... To C. H. Pixton.

The British Empire Michelin Trophy No. 1 and Cash Prize of £500 ... To S. F. Cody.

The British Empire Michelin Trophy No. 2 and Cash Prize of £400 ... To S. F. Cody.

After the Dinner there will be a musical Entertainment.

Committee Meeting.

A meeting of the Committee was held on Tuesday, November 28th, 1911, when there were present:—Prof. A. K. Huntington, in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Col. H. C. L. Holden, C.B., R.A., F.R.S., Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, Mr. C. F. Pollock, Sir Charles D. Rose, Bart., M.P., and G. F. Joseph, Assistant Secretary.

New Members.—The following new members were elected:—Captain Robert Anstruther Bradley, Richard T. Gates, and Captain Godfrey Paine, R.N., M.V.O.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

160. Lieut. H. A. Williamson, R.N. (Bristol biplane, Salisbury).

161. Robert Smith-Barry (Bristol biplane, Salisbury).

162. George Bentley Dacre (Bristol biplane, Salisbury).

163. Lieut. John Graham Bower, R.N. (Bristol biplane, Salisbury).

164. James Arthur Anderson (Sommer biplane, Brooklands).

Observers for Aviators' Certificates.—The following resolution was passed:—

"That in future no aviators' certificates shall be granted by the Committee unless the observers are independent and disinterested persons."

Applications for Aviators' Certificates.—The Committee decided that in future, unless the application form for an Aviator's Certificate is received by the Club before the tests have been carried out by the candidate, the certificates of such tests shall not be accepted by the Committee.

Certificate of Performance.—The Committee decided to issue Certificates of Performance for particular performances of machines.



AERONAUTICAL SOCIETY.

DURING its first month of office the new Council of the Aeronautical Society has received very considerable support in the form of applications for membership, and the Society's roll has been augmented during this brief period by some eighty names, many of them very well known to the world at large. Among those included in the list appended herewith, who have thus signified their approval of the internal reorganisation that the Aeronautical Society has effected, are Mr. Lionel de Rothschild, Mr. Dugald Clerk, F.R.S., the famous expert on gas engines; Messrs. Horace, Eustace, and Oswald Short, the well-known aeroplane constructors at Shellbeach; Sir C. D. Rose, a Past-Chairman of the Royal Automobile Club; the Hon. Maurice Egerton, Mr. Edward Manville, President of the Society of Motor Manufacturers and Traders; Major Sir Alexander Bannerman, Bart., Commandant of the Air Battalion; and a large number of influential officers of the Army and Navy who are interested in the engineering and science sides of aeronautics and desire to extend their support to a representative body dealing with this side of the movement.

The recent elections are:—Marquis of Tullibardine, Lionel de Rothschild, Dugald Clerk, F.R.S., M. A. Adam, Horace Short,

The conditions under which such Certificates will be granted will be announced at a later date.

Military Aeroplane Competition.

Col. Seely, Under Secretary of State for War, has consented to receive a deputation from the recently appointed Manufacturers' Committee. A meeting of that Committee was held at the Royal Aero Club, on Friday, November 24th, 1911, at which the following gentlemen were appointed speakers at the deputation:—

General Policy.—J. W. Dunne, J. H. Ledebor, and R. W. Wallace, K.C.

Inventors and Manufacturers.—H. G. Burford, L. Howard-Flanders, Fred May, Capt. H. F. Wood, and Howard T. Wright.

F.A.I. Conference.

The Conference of the Fédération Aéronautique Internationale was held in Rome on November 25th, 26th, and 27th, 1911, and the following delegates representing the Royal Aero Club attended:—Mr. R. W. Wallace, K.C. (Chairman), Capt. Bertram Dickson, R.F.A., Mr. C. Grahame-White, and Harold E. Perrin, (Secretary). The report of the proceedings will be published shortly.

Statue of Liberty Protest.

The appeal of Mr. C. Grahame-White against the award in the Statue of Liberty Prize was considered at the Conference of the Fédération Aéronautique Internationale in Rome, on Saturday, November 25th, 1911, when the decision of the Aero Club of America was reversed in favour of Mr. C. Grahame-White.

Discussion on "The Military Aeroplane."

The Aeronautical Society has arranged for a discussion on "The Military Aeroplane" on Wednesday, December 6th, 1911, at the Royal United Service Institution, at 8.30 p.m. The discussion will be opened by Col. J. E. Capper, C.B., R.E., and the Aeronautical Society has kindly placed a limited number of tickets at the disposal of members of the Royal Aero Club. Members wishing to attend are requested to make application to the Club.

Membership of the Royal Aero Club.

The membership of the Royal Aero Club is being added to each week, and a large number of new members have been elected during the year. The Committee, however, hopes that all members will use their best influence in extending the membership. The subscription of those members elected between now and the end of the year will cover the period ending December 31st, 1912.

166, Piccadilly.

HAROLD E. PERRIN,
Secretary.

Eustace Short, O. Short, Miss Dunne, Prof. Arch. Barr, Sir C. D. Rose, Capt. A. H. Grubb, Hon. Miss H. Harbord, C. F. Pollock, E. T. Sturdy, Linton Hope, Fred. Small, Dr. W. Watson, Prof. Boys, J. Jackson, Archibald Low, Prof. H. G. Lunn, W. E. Gibson, G. Holt Thomas, P. T. Willows, W. A. Feary, Hon. M. Egerton, Lieut. C. R. Samson, R.N., Capt. E. L. Gerrard, Lieut. R. Gregory, R.N., Lieut.-Col. W. Cockburn, R.A., Lieut.-Col. W. T. Duhan, R.G.A., Lieut.-Col. C. O. Smeaton, Lieut. R. Stone, R.E., W. T. Warry-Stone, H. M. Maitland, Lieut. A. G. Fox, R.E., Lieut. C. M. Waterlow, R.E., Lieut. G. B. Hynes, R.G.A., Major Sir Alex. Bannerman, Bart., Lieut. B. Barrington-Kennett, V. A. Barrington-Kennett, S. Cockerell, F. M. Green, S. T. Seaman, H. Isherwood, G. L. Pitt, Colyar, Pizey, W. G. Aston, P. H. Clift, Lieut. A. Longmore, R.N., H. R. Alderson, H. V. Rose, Sir Wm. Vavasour, Bart., T. P. Searight, Prof. A. Huntington, T. W. Rogers, A. Q. Cooper, Capt. H. F. Wood, G. S. Dodd, F. H. Bramwell, E. Manville, Lieut.-Col. A. F. Mulliner, Lieut. H. Brock, Miss Constance Ogilvie, Capt. C. H. Ley, Dr. T. F. Spong, B. Graham-Wood, Major C. F. Hichens, G. F. Mort, H. T. Winter, W. W. Weldon, C.V.O., A. Everett, Stewart Mallam, A. J. Page, R. F. Bentley, and D. Marshall.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Bristol and West of England Ae.C. (STAR LIFE BLDGS., BRISTOL).

THERE was a good attendance at the annual dinner held on the 23d ult. at the Clifton Down Hotel, Bristol. Sir George White, Bart., presided, and was supported by the Sheriff, Mr. R. E. Bush, Alderman C. J. Lowe, Mr. Samuel White, Mr. A. A. Jenkins, Dr. R. G. Clarke, Messrs. H. G. Doggett, E. Stanley White, H. White Smith, H. Delacomb, J. Valenine, Gordon England, F. Thurston, Sydney Smith, and many others. The toast of "The Club" was proposed by the Sheriff, who said that he thought in these days of wars and rumours of wars the Bristol Aero Club had a very great national purpose. They ought to feel proud they were taking so important a part in aviation and it was gratifying to know that a third of the aviators of the United Kingdom had passed through the "Bristol" schools. Mr. Samuel White replied and spoke confidently of the time in the near future when the aeroplane would be of greater commercial value than it was now.

The toast of "The President" was submitted by Mr. H. G. Doggett, who said it was well known to all Sir George White's friends, that whatever he put his hands to he carried through with characteristic firmness. They were proud of their president.

Sir George White, in his reply, said it was surprising to find an impression in some people's minds that it might be necessary to go abroad to obtain aeroplanes of any description, either for national or private uses. The authorities in this country now seriously realised that aeroplanes in large numbers must form part of the equipment of our forces. As the question was now to be dealt with earnestly, and England must be in advance of any other power, and, therefore, must have hundreds of aeroplanes, he would not believe that either the War Office or the Admiralty would be found wanting in the encouragement of the British industry.

There were several other speeches, which were interspersed with an excellent musical programme.

MODEL CLUBS.

Aberdeen Aero Club (387, HOLBURN STREET, ABERDEEN).

A MEETING of the above club was held on Saturday last at Kincorth in weather that was all that could be desired. There was a large turn-out of members, and excellent flights were obtained with self-lifting models, which, after a few feet run on the ground, rose and flew for about 350 ft. These models, with landing chassis and wheels complete, gave the members a slight idea of a full-sized machine in full flight. Some excellent flights were obtained with a model twin-screw biplane of the finbat type, owned by Mr. Brown. At dusk a display of illuminated flying was given, sparklers being attached to several models. At one time there were five models in the air all throwing out their fiery sparks, and the effect was quite magnificent. A meeting was held in the Trades Hall, Belmont Street, at night, when a paper on models was read by Mr. Anderson, president of the club. Some lively discussion, specially raging round the pitch of propellers, followed. Flying will take place to-day (Saturday), when as usual all interested will be welcome. A meeting will be held in the Trades Hall in the evening, when plans, &c., for a new glider will be discussed.

Birmingham Aero Club (8, FREDERICK ROAD, EDGBASTON).

SOME fine flying by Mr. E. Trykle last week-end was witnessed, and on Saturday he obtained a flight of about 400 to

500 yds., while on Sunday the effect of putting on extra elastic was tested. On being launched, the model immediately began to climb rapidly, and continued to do so until between 60 and 70 ft. high, when it started to glide, and a pretty *vol plané* was witnessed, the best seen since the club has taken the ground. Master Stamps was also getting some excellent flights with his model, and Mr. B. W. Beeby was experimenting with a model of his proposed glider, while the construction of the glider in the shed advanced rapidly. The outstanding feature of the glider is that there are only four wires in the whole glider, the place of wire stays being taken by bamboo struts. The pilot takes a prone position while gliding, his chest being across the front spar and his feet on the rear spar. No controls will at first be fitted, but the angle of the tail will be adjustable while the machine is at rest.

The usual monthly meeting of members takes place on Monday next, the 4th inst., at 8 p.m., at 9, Belgrave Road.

Blackheath Aero Club (5, LIMESFORD ROAD, NUNHEAD, S.E.).

FINE weather favoured each of the three meetings held this week-end, and plenty of practice flights were made at Blackheath, Kidbrooke, and Lee, there being a good attendance of members at each of the grounds mentioned.

Members have been greatly interested in a single-tractor-screw monoplane, which rises from the ground under its own power, and flies beautifully for a considerable distance, although it will persist in doing circles, owing to the torque of the single propeller.

The following new members were elected:—Messrs. Williams and Slatter, of Clapham, and Mr. W. Hendry, of Westcombe Park.

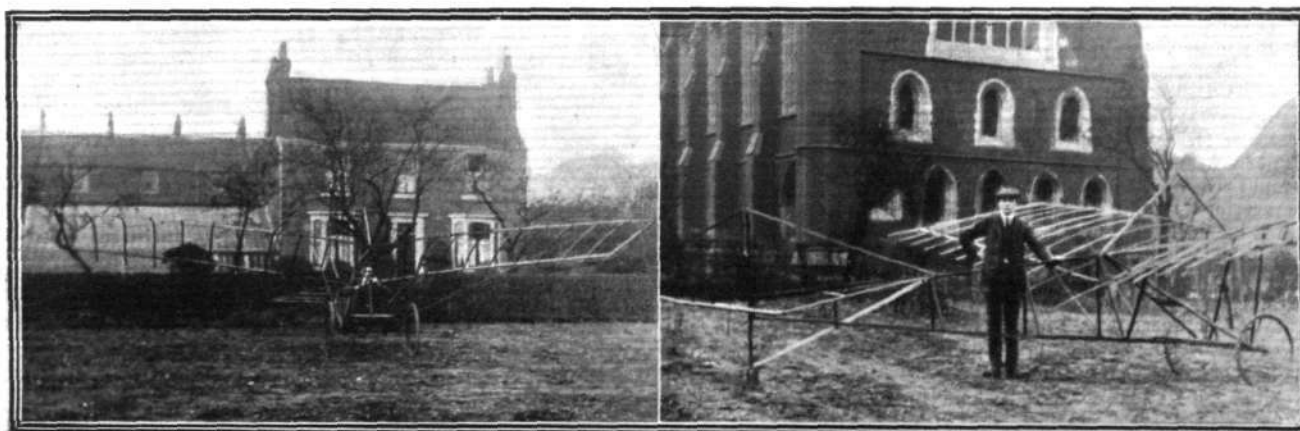
The committee hope to see all the members, and any others interested in model aviation, at Kidbrooke to-day (Saturday), when there will be friendly competitions for distance and duration.

Many members of the club are now working on the models which they propose to show at the exhibition to be held at the Central Hall, High Street, Peckham, on January 4th, and many novelties are promised, including a scale model of a Nieuport monoplane. Several members also promise machines intended to rise from and alight upon land and water, and no doubt the experiments with the latter will be watched with keen interest.

In addition to the distance and duration events, there will be the usual practice at Blackheath and Lee, and the committee hope to see every member present at the latter ground at 11 a.m., Dec. 3rd, with the object of having photographs taken of the club's members and their models.

Brighton and District Aero Club (41, PRESTON ST., BRIGHTON).

THE club's new workshops in Little Preston Street are now nearly fitted up. On Wednesday, November 22nd, Von Wichmann flew 722 ft., securing first-class certificate. His model once landed on the railway lines, the Portsmouth express only succeeding in breaking the after-bracket. On the 25th, Burghope flew 818 ft., getting his ticket. Bate also secured a ticket with over 900 ft., the flight terminating in a ditch. All these flights were made on Brighton-Shoreham aerodrome when the club had "air" to itself. No full-sized machines were out; probably too much wind was responsible. It requires a good deal of enthusiasm to stand about, in bitterly-cold north-east wind, tuning up models, but good flights obtained with



A glider of the Demoiselle type in skeleton, now being constructed at Doncaster by Messrs. F. J. Wright and G. N. Wilton, members of the Conisbrough and District Aeroplane Society.

care are ample reward. About a dozen members turned up on Saturday.

The committee is considering the award of "superior certificates" for quarter-mile flights.

Conisborough and District Aeroplane Soc. (18, CHURCH ST.).

ON November 24th a committee meeting was held, at which a second-class certificate was awarded to C. C. Allport, who had fulfilled the necessary test on the 18th ult. The same person intended to try for a first-class certificate last week, when he passed the theoretical tests, but on winding his rubber preparatory to the practical tests, the rubber hook gave, and the flights had to be abandoned. However, he and J. E. Greathead have expressed their intention to compete for certificates to-day (Saturday). Last week C. C. Allport went to a flying meeting (model) at Sheffield, and brought home one first and one second prize. After the committee meeting, a general meeting was held, when the concert was discussed, as was a proposal to hold a model flying meeting at Doncaster early next year.

The reading of a letter from the Kite and Model Aeroplane Association with regard to affiliation concluded the business.

Coventry Aeroplane Building Society (22, KINGSTON ROAD).

GOOD flying was witnessed on Saturday last, Ryley's single-screw machine making some fine flights, and Overton's O.K. monoplane was, as usual, in form, while King with a new O.K. made a splendid flight, the model reaching an altitude of over 100 ft. Cobb was testing a new machine with crescent-shaped planes, and it showed great promise. Austin converted his model into a main plane, first type, and made one or two good flights. Several members are settling down to hard work in the workshop, designing and constructing models for next season, and the secretary is engaged in the construction of a 4-cyl. rotary petrol-engine.

Liverpool Model Aero Club (39, BROOK ROAD, BOOTLE).

THE weekly meeting produced some brilliant flying, although great distances were not accomplished, because of the circling propensities of most of the models and the strong wind. J. E. Harley qualified for his third class certificate, observed by S. Malins, and thus secured No. 3 of this class, S. Malins, flying exceedingly well, getting up to a good height. Pugh raised club duration record to 25 secs., previous y held by W. S. Ledward with 23 secs. This may make some of the record holders smile, but this is only a young club.

The first-class certificate will probably be made much harder to obtain, for the committee hold that knowledge of theory is as much to be desired as the more practical side of model flying.

It has been found that many model makers fly their machines without the slightest idea of the reason of the flight, and this condition the club intends to do their level best to remedy.

Manchester Aero Club (22, BOOTH STREET, MANCHESTER).

AT a committee meeting held on November 22nd it was arranged that a dinner should be held early in February, and that a public lecture should be given next March. It was also determined that a sum not exceeding two guineas might be given for the best paper delivered during the season.

The following resolution, with regard to the proposed military aeroplane competition, was passed, and it was resolved that copy of same should be forwarded to the War Office:—

"That the Manchester Aero Club considers that the action of the War Office in throwing open the military aeroplane competition to foreign competitors is not conducive to the best interests either of the country or of the British aeroplane industry."

Paddington and District Aero Club (2, EDBROOKE ROAD).

THE secretary will be glad to hear from prospective members. The fees are 1s. per month for members using the workshop, or 2s. 6d. per year ordinary membership; both include use of clubs glides and private ground, free entry to competitions and to lectures, debate meetings, and all affairs arranged by or for the club. Paddington is handy for all, and is the most central club in London.

Members' competition takes place to-day (Dec. 2nd) at Parkside, Sudbury.

The gentlemen who communicated with Mr. Begernie, of Hackney, are requested to kindly address Secretary of this club at 2, Edbrooke Road, Paddington, who has the organising of the Hackney and District Aero Club in hand.

St. Mary's Model Ae. C. (THE VICARAGE, KINGSTON, PORTSMOUTH)

LAST Saturday was the first fine one for three weeks, and even then a very heavy wind was blowing. Messrs. Restall and Eburne made a good show, whilst Mr. Johnson indulged in kite flying, which

was very successful, although two of the planes were torn off by the wind. Murray was out with his O.T. II machine, but found wind very troublesome with so much surface.

Will members please note?—Club meets *every fine* Saturday, windy or not.

Scottish Ae.S. (Model Aero Club) (6, McLELLAN ST., GOVAN).

A LECTURE was given on Friday evening last week, in the club's headquarters, Elmbank Crescent, by Col. J. A. Sillars, the subject being "Aviation Up-to-date, from a Military and Naval Aspect." The lecture was suitably illustrated by limelight views. During the evening the scenes of the Lanark meeting of last year were re-visited, and the slides of the flying shown were highly appreciated, as also were those of this year's *Daily Mail* Circuit of Britain race. The committee regret to notice the small turn-out of members, and hope that future audiences will be much greater.

On Saturday a good day's flying was done at Ibrox. There were no official results noted, but the models of the leaders all flew with their usual efficiency. Mr. Boyd's biplane, with twin four-bladed propellers, was out for trials, and shows considerable promise. Like all Mr. Boyd's productions, this model is simply bristling with originality. Mr. Gordon had an exceedingly unfortunate day, completely smashing up two models. One of them, the old-age pensioner, was fitted with wheels, and endeavoured to get under ground without waiting for a decent funeral. During the afternoon Mr. Gordon's big kite was flying continuously, and helped to attract attention to the model flying.

There will be an unofficial meeting at Ibrox to-day (Saturday) for practice, and an official one for duration attempts next Saturday at the same place. The next paper will be given on Friday evening, December 8th, in the headquarters, the Engineers and Shipbuilders' Institute, Elmbank Crescent. The lecturer will be Mr. Wm. Foster, our hon. sec. The committee beg to draw attention to the club's headquarters, and earnestly request that members will take full advantage of the luxurious lecture, committee, and reading rooms and reference library provided, and remember that meetings will be held there every Friday evening during the winter. More members are urgently wanted.

Smithills (Bolton) Aero Club ("LIEUTENANTS," BOLTON).

DUE to the unfavourable weather, little flying was done on Saturday, but one or two models turned out, however, and some fairly good distances were accomplished. A meeting will be held to-night (2nd inst.) at 7 o'clock. All communications should be addressed to the secretary.

Stony Stratford & District Kite & Model Ae. C. (OLD STRATFORD).

THE first of the series of fortnightly meetings arranged in connection with the above club was held on Nov. 23rd. in the club-room at the Baptist Church Institute. The minutes of the previous meeting were read and confirmed. The question of the opening day was considered, and, owing to the inability of the greater number of the members to be present, it was resolved to bring it out again at a future meeting. The secretary was then called upon to give his reading on "The Wright Brothers' First Gliding Experiments," after which a general discussion on models and prototypes in general was held. Mr. C. L. Matson has kindly promised to give an address on "Gliding Models" at the next meeting, Thursday, Dec. 7th.

The ground was declared open on Saturday, November 25th, when about eight members were present, and some excellent kite flying was indulged in by Messrs. Brown, Butler, Mandeville, and Miss M. Hamilton, Mr. Mandeville maintaining an excellent angle throughout the afternoon, despite the gusty nature of the wind.

Worcester Model Aero Club (VICTORIA INSTITUTE).

THE first flying meeting of the club will be held on their ground, Pitchcroft, Barbourne end, to-day (Saturday) at 3 p.m. Anyone interested is cordially invited to attend, with or without models.

The first of the club's series of monthly competitions will be held on their ground on Saturday, January 6th, 1912, at 3 p.m.

Accessory catalogues would be welcomed by the hon. secretary.

Yorkshire Ae. C. (Model Section) (5A, HULLAND ST., LEEDS).

ON Nov. 23rd, the members of the Model Section derived great pleasure in paying a visit to the Blackburn Aeroplane Co., Leeds. Mr. Blackburn first showed the visitors numerous photos of Blackburn machines, and then a tour of the workshops followed. Upon entering through the great doors, a new two-seater military monoplane, which is in course of construction, at once riveted attention, and proved the centre of attraction for the remainder of

the evening. Each member was allowed to mount a box alongside the pilot's seat, and examine the various controls, &c., inside the body. After Mr. Blackburn had explained several points about the machine, the visitors passed on to a single-seater monoplane, with travel-stained and signature-covered appearance, this being the identical machine used by Mr. B. C. Hucks on his missionary tour. Next came the room set aside solely for the manufacture of the well-known Blackburn propeller, and the ones in stock, for the various types of engines, proved very interesting to examine. The motor enthusiast had full opportunity to gain a little more knowledge, for three engines could be seen, viz., 1-50-h.p. Gnome, 1-50 to 60-h.p. Green, and 1-30-h.p. Green. Mr. Blackburn most generously proffered to lend his 50 to 60-h.p. Green to any member desirous of testing its capabilities on an inch scale model, but there are doubts as to the offer being taken up. Many were the comments made upon the neatness and soundness of the construction of the Blackburn machine, the representative of Yorkshire, from which so much is confidently expected. The members all joined in thanking Mr. Blackburn for a most enjoyable and instructive evening.

Bristol Model Flying (3, ROYAL YORK CRESCENT, CLIFTON).

A MODEL flying meeting was held on the Downs on Saturday last. Models of Messrs. Edgar and Smallcombe flew about 1,000 ft. One 15-inch Smallcombe made nearly a $\frac{1}{4}$ mile, and was then lost to view over sea walls.



SCHOOL AERO CLUB NOTES.

By ROBERT P. GRIMMER, General Secretary,
British Federation of School Aero Clubs.

THE holidays are now rapidly approaching, and I hope our members will devote as much time as possible during that period to the greatest of all sports—model aeroplane flying. December and January are the ideal months for this, the annoying heat *rémoins* of the summer months are absent, our commons and open spaces are far less crowded with inquisitive spectators, the models no longer disappear from sight in a tangle of vegetation, and, moreover, one avoids the exhaustion and fatigue consequent on the sprinting of numerous half-miles in chase of long-distance machines under the fierce rays of a broiling sun. There is no question as to winter being the time *par excellence* for model flying, which is one of the few outdoor sports that one can indulge in at this period without feeling cold. Well, in a fortnight the holidays will be here, and it behoves our members to consider the purchasing or building of models for this joyous period. If the aeromodelist has had some considerable previous experience, he has two courses open, (1) to buy materials for constructing a machine of his own design, or (2) to invest in a parcel of materials for building some standard and successful machine which has already an established reputation as a real flyer. If, on the other hand, the aeromodelist is more or less of a beginner, he would do well to purchase a machine of sound reputation, and one which he knows for a fact to have won prizes in public competitions. At the present time the aero-model market is flooded with cheap German-made models.

In reference to my recent remarks with regard to cheap models and accessories, I have received quite a number of letters from those of our members who have been "had" by the Teutonic product, and I could quote cases where fellows were so disappointed that they assumed that all models were of the same category, and forthwith discontinued the sport. Two or three firms are great offenders in this matter of rubbishy accessories, and although for obvious reasons I can say nothing further myself I shall be very pleased to put any of our members who desire it into communication with other members who have been grievously victimised. Quite apart from this question of quality, it seems highly desirable that British school-boys should purchase British products in preference to encouraging the foreigner at the expense of their own countrymen.

Prominent among the schools which take a serious interest in aviation is Highgate Grammar School, and the Headmaster, Mr. J. A. H. Johnston, B.A., D.Sc., is worthy of the utmost credit for the liberal attitude he is adopting with regard to aeronautics. I am delivering a lantern lecture on "Aviation and the Aero Model" before the members of this school on Friday, the 15th, inst., at 4.0 p.m., at which some unique miniature flying-models will be exhibited. I can make arrangements for any of our members who desire it to attend this lecture if they care to communicate with me at 15, Arlington Road, Surbiton.

In reference to a compositor's error in the last instalment of "School Aero Club Notes," it was not a hare that was struck by the "projectiloplane" on Wimbledon Common but a horse. Still, I doubt if even a hare could outstrip some of these dangerous instruments that have come under my observation during this last season.

The next flying meeting is on the Downs to-day (Saturday), at 3.15 p.m.

The first meeting of the Bristol Aeronautical Society will take place at No. 16, Berkeley Square, Upper Byron Place entrance, Clifton, on Wednesday, December 6th, at 7.30 p.m. All interested in flying are welcome, and are invited to bring models, drawings, &c., with them. No one will be under any obligation to join.

SCHOOL AERO CLUBS.

Arundel House School Ae.C. (15, ARLINGTON ROAD, SURBITON)

ON Saturday, the 25th ult., Mr. R. F. Mann, who remains an honorary member of the club, flying a standard Mann monoplane, at Mitcham Common, made a straight flight of just over 1,400 yds., or considerably more than three-quarters of a mile.

Ilford County High School Model Ae.C. (83, ENDSLEIGH GDNS.).

A MEETING of the above club was held on November 21st, when about fifty members were present. Mr. Silver kindly accepted the presidency, and B. Fitzsimons was unanimously elected secretary. A committee consists of Masters Potter, White, Cawthorn, Fozzard, Nicholls, Mees, and Mr. Silva and secretary.

The club, through the secretary, will be very pleased to receive lists of accessories from dealers.



AIRSHIP NEWS.

Speed Trials with "Selle de Beauchamp."

ON Monday the Lebaudy dirigible, "Selle de Beauchamp," was put through its official speed trials, and twice covered a course, of which the points were Moisson, Rosny, Mantes, Limay, and Moisson, the time taken being two hours. Although the aggregate speed was not announced, it was stated this exceeded by 9 kiloms. the stipulated minimum. The airship was under the command of M. Leon Berthie.

"Ville de Bruxelles" Again at Work.

HAVING been re-inflated after a long period of rest the "Ville de Bruxelles" was cruising over the Belgian capital for a little over an hour on Sunday afternoon, and during that time it was steered above the royal carriages carrying the King and Queen to the Patronal festival at the Cathedral. It subsequently returned to its shed at Etterbeck.

"Adjudant Vincenot" Out Again.

DURING the morning of the 21st ult. the dirigible "Adjudant Vincenot" made a lengthy voyage of the neighbourhood of Nancy, and had a good testing, as, in addition to the rain, there was a stiff breeze blowing all the time.

"Z 2" Back at Cologne.

THE modifications to the new Zeppelin military dirigible having proved satisfactory during an hour's flight over Lake Constance on the 21st ult., the airship set out on the morning of the 23rd to return to its headquarters at Cologne. Friedrichshafen was left at 7.30, and after passing Ulm at 9.45, Stuttgart at 10.15, Mannheim at 11.40, Mayence at 12.45, Bingen at 1.15, Coblenz at 1.45, the airship arrived at Cologne at 3 o'clock in the afternoon. Major Neumann was in command, assisted by Capt. Schoof and Engineer Ebrsbach. After a preliminary cruise of half an hour on the 25th it went to Dueren and back, a 2½ hour trip. On the 21st "Z 1" was out at Meiz for over an hour, preparing for a voyage to Cologne.

"Schwaben" Goes to Baden-Baden.

WITH a crew of 13 and 4 passengers, together with provisions for 20 hours, the Zeppelin liner "Schwaben" left Johannisthal on the 22nd ult., to return to Baden-Baden. Berlin was left at 6.45, and Leipzig reached at 9.42. Going on, the airship passed Apolda at 10.50 and Erfurt at 11.20, and reached Gotha at mid-day. There, in view of the rain which was falling, it was decided to seek the shelter of the airship harbour. The journey was resumed on Monday last, Gotha being left at 9.15, and after passing Eisenach at 9.45, Heidelberg at 2.8, and Carlsruhe at 3.10, the dirigible landed safely at Baden-Baden at 4 o'clock.

"M 2" at Bensberg.

ON the 25th ult. the Gross military dirigible "M 2" went from Cologne to Bensberg, where it was examined by the officers at the military school. While there a despatch was received ordering an immediate return. The airship started back and was at Cologne in ten minutes under the hour.

SCIENCE VERSUS GRAVITY.

It took western humanity quite a long time to discover gravity, or rather, perhaps, it is better to say that it was a long time before any human intelligence in this hemisphere took notice of the great natural force, manifested in all physical objects, with sufficient perception and logic to make known to the world a law. For this we have to thank Newton, and to him also we owe an everlasting debt of gratitude for having thus early established the rule that every action is necessarily accompanied by an equal and opposite reaction. Where the action is brought into effect by the outcome of human agency, the reaction is self-evident to the meanest intelligence. You push against a door, and it pushes against you; if you only expected to find the door where none actually exists, you go headlong through the gap, and you realise that your force is not a force at all until it meets the resistance of an equal and opposite reaction. Alternately, if you try to pull on a rope, it is necessary that the rope should pull against you, otherwise the situation becomes equally ridiculous in the eyes of the spectator.

In nature, there is a great big pull going on all the time between the earth and every physical object around the earth's surface. This pull keeps everybody and everything in close contact with the ground, for although these objects pull against the earth with just as much force as the earth pulls against them, they are for the most part unable to keep their footing in the atmosphere and, consequently, the only stable position is that in which they are actually in contact with the earth's surface. The measurement of the pull existing between the earth and any object is, of course, the weight of the object in question.

Hitherto, man has invented only two ways of obtaining a footing in the atmosphere whereby to successfully resist the force of gravity, and one of them has but quite recently become really successful in the practical development of the aeroplane. Both methods may be broadly described as very clever methods of manipulating the air. In the case of the balloon, the manufacture of a light non-porous fabric has enabled man to imprison enormous volumes of fluid having a density that is only natural to the upper regions of the atmosphere. The gas tries to find its own level, and the buoyancy of the balloon derived therefrom affords the purchase by means of which the balloon, as a whole, is able to resist the downward force of gravity. In the case of the aeroplane, the wings create a local disturbance, consisting of an acceleration of the air molecules, which, taking place in a downward direction, gives rise to an upward reaction sufficient to support the machine, in its flight, against gravity.

It has often been suggested that man will discover other means than these of obtaining a foothold in the atmosphere sufficient to enable him to resist the gravitational impulse, and some minds have even conceived it possible to temporarily neutralise the manifestation of the force itself over some specific area. Bulwer Lytton's account of "Vril" in his "Coming Race" is, for example, a phantasy that has fascinated many early believers in the future of flight, and is no less interesting to the present generation.

That scientists are at work on the subject may be assumed without any shadow of doubt, but when and to what extent they will be successful within our own lifetime is, of course, a matter on which we cannot hazard a conjecture now. Nevertheless, it would seem as if the subject is not without its immediate interest, for there is a report of certain experiments recently conducted in America, which seems to suggest that it is possible to obtain anti-gravitational force by means of an electrical discharge. As the matter is first brought to our notice by our American weekly contemporary, *Aero*, and the subject matter is likely to be of uncommon interest to our own readers, we reproduce the article in question, so that our readers may have an opportunity of reading it in that journal's own words. Here is the article in question:—

"The bogey of unstable equilibrium is now being attacked in a new way. Parachutes, gyroscopes and other life-savers for aviators will be put in the discard if the claims of Edward S. Farrow, a New York engineer, for his invention are borne out by future tests. Farrow says he has discovered a mechanical means to suppress gravitation. This is revolutionary—even sensational—to be compared with the formation of the law of gravity itself. Farrow believes he has solved the most perplexing problem connected with aerial navigation—the suspension in air of an aeroplane after its engine, through accident or other cause, has ceased to work.

"At a demonstration before a body of scientists and others, in his New York laboratory, Farrow suspended a book from a pair of scales and weighed it. The volume tipped the scales at 18 ounces. To the book he then attached a mechanical device in the shape of a small rectangular box, which he calls a 'condensing dynamo,' and applied power from a neighbouring electric switch. As the current set the wheels in the dynamo whirling, the indicator of the scales slowly receded until it stood at 15 ounces. Apparently the book had lost 3 ounces of weight. In other words, one-sixth of the

power of gravitation between the book and the earth had been overcome. A law of nature had, to all appearances, been nullified.

"That the claims of Farrow are being given the most serious consideration is evidenced by the fact that the United States Government engineers are now conducting a series of experiments to determine the value of the invention to the Army and Navy aeroplanes and balloons. Farrow and his associate, Gen. George O. Eaton, have filed their claims for a patent for their 'condensing dynamo,' but the mechanical details of the contrivance will not be announced until the Government experts have completed their experiments. It may be stated, however, that the idea behind the device is based on the intensification of Hertzian waves, which are used in wireless telegraphy. It has been learned that by doing this, a parallel and corresponding intensification occurs with the vertical force which controls gravitation. This buoyancy is added to an object held to earth or propelled toward it by gravity.

"Hertz demonstrated that a very rapid oscillating discharge of electricity produces a disturbance in the surrounding ether, which takes the form of electric waves penetrating space with the velocity of light. Farrow's investigations were based on a fundamental idea of creation expressed in a well-known algebraic equation. The formula means that action and reaction are equal, simultaneous and contrarily opposed. He found that mechanical devices for controlling electricity also apply to gravity, regulating or intensifying the force of this attraction of foreign objects to the earth. By intensifying the motion of the electrical waves through supposititious ether there will develop components in all directions. If this force or motion acts vertically, it will, by the law of reaction, diminish a force such as gravity acting downward toward the earth. For want of a better name, Farrow calls this force, when acting upward, a 'vertical component.'

"Farrow discovered that an intensification of the Hertzian waves caused a corresponding intensification of the 'vertical component.' Supposing that a Hertzian wave has a force of, say, 10,000, and that this is increased to 20,000 more, the force of the 'vertical component' would be correspondingly increased.

"And if this 'vertical component' resisted the force of gravitation, then the latter would be partly or wholly neutralized or suppressed. The 'condensing dynamo' invented by Farrow increases the force of the Hertzian wave, and this increased power is transmitted to the 'vertical component.' The latter thus intensified offers a proportionate resistance to gravitation, and the force of the latter is reduced, thus giving buoyancy to any object to which the condensing dynamo may be attached. An aeroplane equipped with one of these dynamos of sufficient strength may be sustained in air after its motive power has ceased to work. By turning on the current of electricity there would be produced a horizontal circular flat sheet, so to speak, of Hertzian waves radiating outward for a mile or more on every side of the aerial craft. The effect of all this would be, in a measure, to suspend the craft by the edges of a thin magnetic plane of influence, a mile or more in horizontal circumference.

"It was while a cadet at West Point, as a member of the class of 1876, that Farrow first became interested in wave motion, that complex phase of physics which enters into the explanation of many of the forces of earth and air."



£304,000 for French Military Aviation.

HAVING obtained the leading position in military aviation, the French Government is determined to hold her own at all costs. No doubt spurred on by the movement which is going on in Germany, and in a minor fashion, in Great Britain, it is proposed that in next year's war budget the sum allocated to military aviation in France should be 7,600,000 francs (£304,000). In his report M. Clementel points out:—

"Jusqu'à ce jour, le Parlement n'a pas hésité à encourager de nobles et courageux efforts; à l'avenir, il ne refusera pas d'avantage les crédits nécessaires."

"Nous avons dès maintenant, en matière d'aviation, une avance que les puissances étrangères seront lentes à regagner; mais il faut y prendre garde; elles se sont mises sérieusement à l'œuvre dès cette année."

It is to be hoped our legislators will take these words to heart.

A Dutch Military Pupil at Breguet School.

ON the 24th ult. Lieut. Kolyn, an infantry officer in the Dutch Army, arrived at the Breguet school to undergo a thorough course of instruction in the management of these machines.

A Maurice Farman Military Biplane.

ON Monday, at Buc, Maurice Farman, with Derome, were testing, by flying it to Neauphle-le-Chateau and back, a new military biplane which is characterised by a monoplane tail.

AIR EDDIES.

C. W. C. WHEATLEY, M.A., and S. V. Sippe, both of the Avro school, are collaborating in the production of an instrument which, once its successful operation is proved, should revolutionise cross-country flying, in that the difficulty of maintaining a true course to a given point will be reduced to a minimum. The instrument has the appearance of a simple box, under the glass lid of which passes a map on rollers. Directly above the map are two spider lines, intersecting each other at right angles, which move in relation to the direction and distance travelled by the vehicle on which the instrument is placed. In starting away from a certain spot, the lines are adjusted so that they intersect over the point representing that spot on the map, and no matter what direction is taken or what speed is maintained, these spider lines will always move and indicate the course which has been taken.

It is first intended to adapt this instrument, which will be known as the "Viascope," for use on automobiles, as the rate of rotation of the front wheels is in direct relationship to the speed. Its adaptation for use on aeroplanes and steamships is a matter of greater complexity, as it is impossible to arrive at their speeds relative to the earth by such easy means as is the case with cars. However, Wheatley is at present at work on a speedometer which will indicate speed relative to earth without any direct connection with the latter, and the combination of these two machines should prove of the greatest service in all forms of navigation, whether on sea, on land, or in the air.

In a letter from St. Petersburg, Lewis Turner, who is carrying out tests on the new biplane of the Kennedy Aviation Co., mentions that at the last meeting of the Russian Imperial Aero Club a suggestion was put forward to form a volunteer corps of aviators. Each member of the proposed corps would have to devote a certain portion of the year to practice, and in the event of war breaking out would be under command and at the disposal of the Commander-in-Chief of the Russian Army. The club intend to obtain official sanction of this project by submitting it to the Imperial Duma.

It was also suggested at this meeting that a tax be imposed on aeroplanes, and with this purpose in view the Sporting Committee of the club were asked to determine the number of aviators and aeroplanes in Russia.

I hear that Alan Boyle, who will be remembered as having done much to popularise the now extinct Avis monoplane, and who, unfortunately, had to give up practical work in connection with aviation owing to his bad fall at the Bournemouth meeting last year, is going away to Ceylon for the winter.

It is interesting to note that not only was the early Avro machine the first, in England, to leave the ground, with the exception of the accidental free flight of the Maxim aeroplane at Baldwyn's Park, but it has proved the first to leave the water. As was reported last week, Commander Schwann, piloting the Avro hydro-aeroplane at Cavendish Dock, Barrow, rose to a height of 20 ft., but had the misfortune to descend rather more abruptly than was intended,

damaging one of the floats, and the left-hand bottom portion of the *cellule*. He rightly attributes his rough descent to his lack of experience in piloting rather than to any lack of stability on the part of the machine. I hear that in fitting the new floats Commander Schwann intends to somewhat modify their method of attachment to the machine.

I am glad to see that the International Aeronautical Federation have ruled that the £2,000 Statue of Liberty prize be awarded to Claude Grahame-White, thus setting the wrong decision of the American Aero Club right. This latter body were, in the first place, obviously not justified in awarding the prize to the late Moisant, as he did not previously undertake the one hour's eliminating flight.

After his untimely death, although an opportunity presented itself to right the wrong, and to award the prize to Grahame-White, the American Club maintained their stubborn attitude, and re-awarded the prize to De Lesseps, who neither eliminated for the contest, nor came within nine minutes of Grahame-White's time for the return flight round the Liberty Statue. It is to be hoped that the overruling of the I.A.F. will teach them a lesson.

Undoubtedly a very excellent notion on the part of the Brooklands Automobile Racing Club is the establishment at the flying grounds of a number of tennis courts for the use of the members. These courts, surfaced with yellow sand, are arranged to the rear of the club house in the paddock, and are to be opened to-day (Saturday) at two o'clock. A competition has been arranged between a number of well-known players to celebrate the inauguration.

Time is not being lost by the Government in maturing their plans for going ahead with aeroplane development. The details governing the competition are likely to be announced in about three weeks' time, and these tests will, in all probability, take place in June next. To induce good entries there will, of course, be a substantial cash first prize, and beyond this there is to be a subsidiary prize for machines of British manufacture, possibly including the engine. Then will come the orders for victorious machines, but these will assuredly have to be constructed entirely in England, thus maintaining the policy of keeping the production of all war materials within our own shores. Rumour hath it that, according to the lines laid down in *FLIGHT* last week, the Government are likely to give British constructors orders for about fifty aeroplanes immediately after their forthcoming announcement.

Many are the revolutionary discoveries that are rumoured—really about as far as most of them get—from America. The latest sensation has been the statement of a New York engineer, Edward S. Farrow, to the effect that he has discovered the means of partly or wholly neutralising the force of gravity by means of Hertzian waves emitted from a piece of apparatus that he terms a "condensing dynamo." It is claimed that his device will keep an aeroplane sustained after the latter's motive power has ceased to work. If this be the case, one wonders why he intends encumbering himself with an aeroplane at all, when he could fly with his new gravity-resisting device by merely strapping the apparatus to his person.

We live in a wonderful age!

"OISEAU BLEU."

AVIATION IN PARLIAMENT.

DURING last week several questions were asked in Parliament concerning aviation, and quite a deal of information was obtained from Colonel Seely regarding the proposed tests of aeroplanes by the British Government. In reply to Mr. Joynson-Hicks, Colonel Seely said that as the report of the British officers who attended the French Military Competitions at Rheims had not yet been received at the War Office, he was unable to say whether that competition was confined to machines of French manufacture, but he would consider those reports before he issued his prospectus for the British Army test. In further reply to Mr. Joynson-Hicks Col. Seely repeated that the object of the British competition was to find out the best pattern for military requirements, and it was therefore intended that the competition for the chief prize should be open to all manufacturers, British or foreign, and that the aeroplanes which the Government would require must ultimately be manufactured in this country, for obvious reasons, but that did not imply that it was wise to limit the competition for finding the best type of machine to this country.

In replying to the Marquis of Tullibardine, Col. Seely said that the Government would take the opportunity to encourage the British manufacturer when the occasion arose.

Mr. Sandys put a question as to the payment of expenses incurred in cross-country flights by officers of the Air Battalion, and Col. Seely said it was not proposed to reimburse officers for flights made on their own initiative and independent of any official instructions. In reply to a further question, he said no fixed time could be stated at present for which officers who have obtained certificates will be attached to the Army Air Battalion for instruction in military aviation.

A query by Mr. M. Sykes enlisted from Sir E. Grey the information that the Declaration drawn up by the Hague Conference, prohibiting the discharge of projectiles from balloons, &c., was not signed by the Italian plenipotentiaries. It was signed by the Turkish plenipotentiaries, but was not ratified by the Sultan. He had no information as to how far the principles laid down in the Declaration had been observed or disregarded by the belligerents in Tripoli.

On Tuesday, in reply to Mr. Fell, Col. Seely said one Army airship was ready for use, and practice would be carried out when conditions were favourable. Officers and men were in training for the use of dirigible balloons, but they had had no lessons on the Continent.

BRITISH NOTES OF THE WEEK.

First Superior Certificates.

ALREADY three British pilots have made the necessary flights to secure the Royal Aero Club's superior *brevet*. The first to do so was Mr. S. F. Cody, who on Monday made his flight from Laffan's Plain to Salisbury and back. On Wednesday, Mr. James Valentine, on the Bristol monoplane, and Captain Fulton, on a Bristol biplane, also made the required qualifying flights. The course taken by the two latter pilots was from Salisbury Plain to Laffan's Plain and back, a distance of approximately 100 miles.

In regard to Mr. Valentine's essay, it was really the public *début* of the new Bristol monoplane, which makes the performance all the more interesting. Salisbury Plain was left at 11.45, and the outward journey occupied 45 minutes, while the return trip took 9 minutes longer. The aviator explained that he lost time coming back, by leaving his course in order to wave to Capt. Fulton, who was passing. In the subsequent altitude and gliding tests, he went up to a height of 2,000 ft., and, gliding down, alighted exactly on the designated spot.

Mr. Grahame-White Awarded the Statue of Liberty Prize.

At the meeting of the Fédération Aéronautique Internationale at Rome, on the 25th ult., a protest of the Royal Aero Club against the award of the Statue of Liberty prize to M. De Lesseps was considered, and it was decided that the prize should be awarded to Mr. Grahame-White. It will be remembered that this prize of £2,000 was put up in connection with the Belmont Park Meeting in October, 1910, for a flight from the aerodrome round the Statue of Liberty and back. The prize was at first awarded to the late Mr. J. B. Moisant, but, as under the original rules he had not qualified, the prize was, after protest by Mr. Grahame-White to the F.A.I., awarded to M. de Lesseps, the authorities of the meeting disqualifying Mr. Grahame-White for alleged fouling of a pylon. A second protest was then made to the F.A.I., with the above result.

Aeroplanes for Territorials.

THE good work which is being done with a very scanty equipment by the London Balloon Co. of the Territorials will be considerably benefited by the use of the two Short biplanes which have been placed at its disposal by a well-known member of the Royal Aero Club at the club's grounds at Eastchurch. Some fourteen members have volunteered to go through a course of training, and for those who cannot afford to spend the necessary three weeks or a month at Eastchurch arrangements are being made for special instruction to be given during week-ends. The generous lender of the aeroplanes has undertaken to look after their maintenance.

A Blériot at Eastbourne.

A COUPLE of good flights were made at the Eastbourne Aerodrome on the 21st ult., by Mr. F. B. Fowler on a Gnome Blériot, on which he attained a good height.

Bristol Biplanes Abroad.

VERY soon there will not be many corners of the world in which a Bristol aeroplane will not be found. Russia, of course, has a little fleet of nine, and in France itself Versepuy flies a Bristol;

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FOREIGN AVIATION NEWS.

The Paris Salon.

PREPARATIONS are actively in progress at the Grand Palais for the Aeronautic Salon which is to open on the 16th inst. Naturally, a feature of the exhibition will be the machines which have proved so successful in the recent French military competitions, but apart from those there will be a comprehensive display of most of the other types with which any good results have been obtained. Meanwhile, the combined committee representing the aeronautic and automobile industries which is meeting, under the presidency of the French Minister of Commerce, M. Couyba, is making progress in its work, and has reached the decision to hold automobile and aeronautic salons annually. Application has been made to the Minister of Fine Arts for the use of the Grand Palais from October 5th next year to January 5th, 1913.

"Flying Angels" on an Aeroplane.

RECENTLY AT Compiègne, on Sunday, Legagneux was flying on his single-seater Blériot, and during one trip carried a passenger on his shoulder.

A Japanese Biplane at the Grand Palais.

IT is reported that on one of the special stands at the forth-

Lieut. Dahlbeck has taken a Bristol back to Sweden for use there, and it is rumoured that another European Power is about to experiment with Bristols. Of the Colonies, Australia has her Bristol pilot in the person of Mr. Hart, the first Australian to take his *brevet* on his native shore; in South Africa the Bristol is being flown by Mr. John A. Weston; while India, which is already acquainted with the Bristol machines, will soon see one being piloted by Lieut. Harford, who recently took his *brevet* at Brooklands. It will be remembered, too, that the first certificated Chinese aviator was trained at the Bristol, Salisbury Plain, School.

An Aero Club for Brighton.

ENCOURAGED by the strong support locally some influential people are organising a club with a view to installing a club-house on the Shoreham Aerodrome. It will be remembered that on the occasion of the European Circuit £400 was contributed by this station, and of this amount £100 was raised by the small shopkeepers of Shoreham, an indication of their keenness in the matter. A competition is being organised among members of the club, and among the prizes received is a handsome silver trophy presented by Messrs. P. B. Burgoyne & Co., the well-known Australian wine merchants, through the instrumentality of Mr. Alan Burgoyne, M.P. Mr. G. A. Wingfield is acting as honorary secretary *pro tem.* until an expert in aviation can be found to fill the post.

From Coachbuilding to Aviation.

FOR close on a hundred years Messrs. Henry Matthews and Co. have been supplying timber to the coachbuilding trade, and they have now turned their attention to aeroplane construction. The firm has the advantage of understanding exactly what is required by aviators, as one of its members has taken a very keen interest in the new science from the very early stages. Messrs. Matthews and Co., whose address is Hope Works, Ley Street, Ilford, are prepared to estimate for straight or bent timber of any description.

Model Aeroplane Accessories.

FOR the convenience of our readers, Messrs. J. Bonn and Co., Ltd., of 95, New Oxford Street, London, W.C., have put their catalogue into book form, which makes it very convenient for reference. We notice that the firm are now making four different types of propellers, ranging from 6 ins. to 20 ins. in diameter. They are beautifully finished, and up to the usual high standard of Messrs. Bonn's other goods.

"How School Boys Can Help Aviation"

IS the title of an article contributed by Mr. Robert P. Grimmer to the issue of *The Boys' Own Paper* of Nov. 4th. It deals with the flying of models, and, doubtless, after perusing it many boys will take up the sport, and this should lead to the formation of a good many more school aero clubs in various parts of the country.

Another Model Aeroplane List.

MR. M. L. ROLFE, Chiltern Grove, Sudbury, Suffolk, sends us a list of model aeroplanes and accessories which he is now selling. Mr. Rolfe has had a good deal of experience in the making and flying of models which should prove valuable to his supporters.

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coming Aeronautic Salon will be exhibited a military biplane built for the Japanese Government by Baron Shigeno.

Ladies at the Maurice-Farman School.

MONDAY was quite a ladies' day at the Maurice-Farman School at Buc, Madame Balencie being taken for a trip by Maurice Farman, while M. Barbaroux, engineer of the Delaunay-Belleville firm, and M. Bernard Langarot, both took their wives for excursions in the "central blue."

Trials with the New Morane-Saulnier Monoplane.

ON the 21st ult. Tabuteau was putting one of the new Morane-Saulnier monoplanes through its paces, and in the course of a couple of flights the new machine demonstrated a good turn of speed, and showed up very favourably in gliding. In general appearance this monoplane is very suggestive of Nieuport practice, but is, of course, entirely original in its details, as would be expected from a collaboration of Morane and Saulnier.

From Vincennes to Rheims.

LIEUT. LELIEVRE, on the 21st ult., flew from Vincennes to Rheims, covering the 130 kiloms. in 1 hr. 5 mins. He had a strong following wind, but was much bothered by the thick fog.

Maurice Farman Carries an Ambassador.

THE Grecian Ambassador to France made a visit to Buc on the 21st ult., and was taken for a trip over St. Cyr, Trappes and Voisins by Mr. Maurice Farman.

At the Caudron School.

RENE CAUDRON, on the 21st ult., made a fine flight after dark on one of the Caudron biplanes, while de Laet, the chief instructor, was timed to attain a speed of 102 k.p.h. on one of the racing machines.

New Sommer Machine.

AT the Sommer school at Douzy, on the 21st ult., Molla made a trial flight in a strong breeze with the new metal frame biplane, and Bathial, on the Sommer monoplane, during a flight of half an hour, got up to a speed of 125 k.p.h.

British Officers at Nieuport School.

THE British officers at the Nieuport school at Mourmelon are making good progress. On the 23rd ult. Capt. Barrington Kennett was flying for 20 minutes, and making figures of eight with the ease and grace of a master pilot.

Varnish in the French Military Competitions.

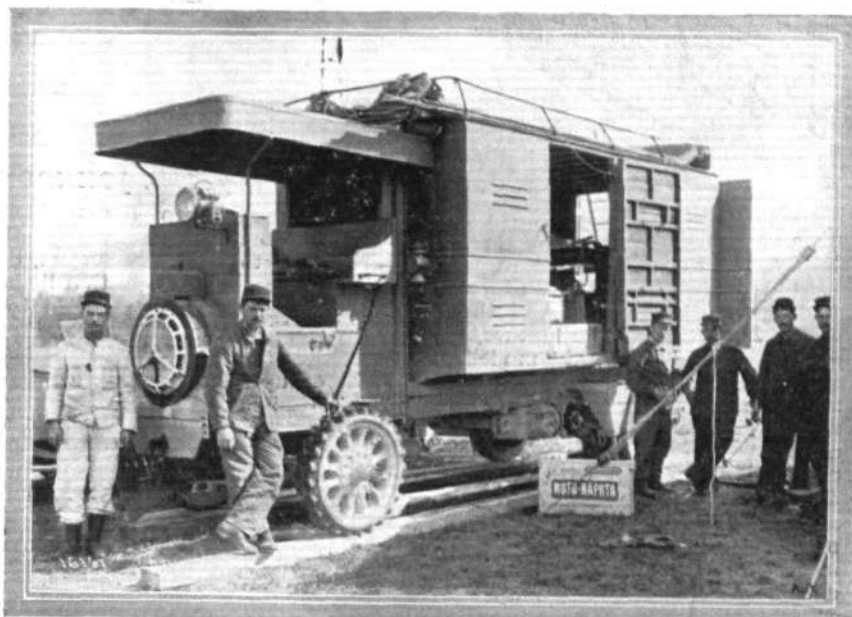
AN interesting point in connection with the recently concluded French military tests of aeroplanes is that, out of the 38 starters, 11 were treated with Emaillite varnish, to which we recently referred, and of the nine who qualified seven were so treated, including those which secured first and third places.

Three Accidents of the Week.

AT Chicago, on Tuesday of last week, a serious accident befell Mr. Belton, an ex-British Army officer, who, whilst learning the art, fell from a height of 400 ft., and sustained very serious injuries.

On the 25th ult., while practising at Doeberitz, Lieut. Loringhoven was killed. He was descending from a height of 300 metres by a *vol plané*, and when within 50 metres of the ground, through being caught by a gust of wind, the machine capsized.

On the 26th ult., at Turin, during an instructional flight, a young man, named Decroce, fell and sustained fatal injuries.



Accompanying the French military manoeuvres in connection with the aviation section has been the motor workshop fitted upon a heavy chassis as seen above. In and on this are carried spare parts of monoplanes and biplanes and a number of special hand machine tools which are instantly available for setting right any structural mishap which may occur during active operations. The French have early grasped the wonderful and practical uses to which the aeroplane can be adapted, especially when working in conjunction with such a mobile unit as the workshop above seen.

An Aerodrome for the Wright Brothers.

THE information cabled from America to the effect that the Wright Brothers have purchased a thousand acres of land in North Carolina, in order that they may carry on their experiments in secret, is hardly surprising. Although the property does not include the famous Kill Devil Hill, it is in the immediate neighbourhood, and just as suitable for the work, consisting of undulating sand, with big dunes here and there. It is reported that the series of gliding and stability experiments will be resumed at this new ground in the spring of next year.

THE FRENCH MILITARY COMPETITIONS.

AFTER over a week of inactivity, due to the adverse weather conditions, it was possible for the remaining tests over the 300-kiloms. course from Rheims to Amiens and back to be taken on Sunday last. Four of the nine competitors still left in decided to make their third and last trial, although there was a strong breeze blowing, and a good deal of fog about. Prevost on his Deperdussin was the first to be started at a quarter past ten, but after half a circuit of the ground he decided to come down. Vedrines got away 10 mins. later, and reached Berbery-au-Bac, about 25 kiloms. from Rheims; Fischer was away at 10.50, Moineau at 10.55, Bregi at 11, and Prevost made a fresh start at 11.45. Fischer and Prevost were both brought down by the fog, and Moineau and Bregi were the only ones to complete the round trip. By this Moineau secured second place, and Bregi the fourth place. When the result became known, sympathy was freely expressed with Prevost, as but for the detour which he made in his trial, through his map blowing away, his average speed would have been sufficient to have made his position as runner-up secure. It will be remembered that during the speed tests from Rheims to Mourmelon his average speed was 107 k.p.h.

The result, which at the time of writing is not officially confirmed, of the competition is a win for the Nieuport monoplane, piloted by Weymann, and this will be bought by the French Government for 100,000 francs, as well as ten similar machines at 40,000 francs, plus a bonus of 28,000 francs, being at the rate of 500 francs per kilometre that the average speed was above 60 k.p.h. The total amount secured by the Nieuport firm is therefore 780,000 frs. Moineau's success secures for the Breguet firm an order for six machines at 40,000 frs. each, plus a speed-bonus of 17,500 frs.; while Prevost won for the Deperdussin firm an order for four machines at 40,000 frs., plus a speed-bonus of 14,500 frs.

The particulars of the winning machines, and the times and speeds

made over the 300-kiloms. course from Rheims to Amiens and back are as follows:—

Pilot.	Machine.	Motor.	Propeller.	Time for 300 kilom.	Average speed.
				h. m. s.	k.p.h.
Weymann	Nieuport*	Gnome...	Chauviere	2 33 5 $\frac{1}{2}$	116.976
Moineau	Breguet†	Gnome...	Chauviere	3 9 16 $\frac{1}{2}$	95.1
Prevost	Deperdussin*	Gnome...	Rapid	3 21 5	89.515
Bregi	Breguet†	Gnome...	Chauviere	3 26 47	87.047
Fischer	H. Farman†	Gnome...	Chauviere	3 33 5	84.474
Barra	M. Farman†	Renault	Chauviere	3 56 13 $\frac{1}{2}$	76.196
Renaux	M. Farman†	Renault	Chauviere	4 8 40	72.38
Frantz	Savary†	Labor	Chauviere	4 27 49	67.210

* Monoplane. † Biplane.

The amounts gained are—

Weymann (Nieuport)—	frs.
Purchase of winning machine	100,000 (£4,000)
10 replicas at 40,000 frs. each	400,000 (£16,000)
Speed bonus at 500 frs. per kilom.	280,000 (£11,200)
Total	780,000 (£31,200)
Moineau (Breguet)—	
Purchase of 6 machines at 40,000 frs.	240,000 (£9,600)
Speed bonus	105,000 (£4,200)
Total	345,000 (£13,800)
Prevost (Deperdussin)—	
Purchase of 4 machines at 40,000 frs.	160,000 (£6,400)
Speed bonus	58,000 (£2,320)
Total	218,000 (£8,720)



Conducted by V. E. JOHNSON, M.A.

BEFORE considering questions and problems relating to model aeroplanes in general, it may not be amiss to examine briefly the word "model"—a word with regard to which very many persons have quite a wrong impression. If we consult a dictionary we find the noun means "a pattern, a copy, especially in miniature," but the verb "to form" or "plan," and the word "modeller" a "planner" or "contriver," and the word "pattern" is defined as "an original or model"; the older and more correct form of the word not meaning a copy, but the original, the model being the original and not the copy. We are concerned then not with mere copies of things, but with originals as well, and any model aeroplaneist who desires to live up to his title must show *originality* in his work; there is always plenty of scope for originality, not only in experimental model aeroplaning, but in the copying of already existing machines as well. For our efforts to lead to success one thing is essential—it must be originality of the right kind, and it is exactly at this point that theoretical knowledge becomes so valuable. Scores of model makers—not necessarily of aeroplanes, but model makers generally—have wasted hours and hours of their time and pounds and pounds of their money either by attempting something which theoretical knowledge would have shown them was impossible, or in achieving their ends but by a very inferior method. A slavish copier may become an expert in the use of his tools, but he will be nothing more. After all, the labour necessary to scheme out an original model should form one of the greatest pleasures of an amateur's work, and is, above all, a splendid exercise for one's inventive genius. But all have not this faculty. Perhaps not, but it is surprising how it can be cultivated. It is said that no one ever lived who was *entirely* wicked. Similarly I do not believe that anyone ever existed who is *entirely* without this faculty. We see it even in animals. The beaver is an architect, builder and wood-cutter. The marmot is a civil engineer. The former cuts down trees and erects houses and dams; the latter not only builds houses, but constructs aqueducts and drains to keep them dry. The squirrel is a ferryman, and with a chip or piece of bark for a boat and his tail for a sail he can cross a stream. By all means let young England enjoy his manly sports and pastimes, but do not let him forget the mental race that he has to run with the educated not only of his own but of *foreign* nations, some of whom, I regret to say, set a far higher store on originality than we do here—even when it is of the right kind. If he neglects this faculty, or cultivates it in a slipshod manner, devoid of all method, personal observation and theoretical study, then England is going to take in the not far distant future a very second-rate place in "The Battle of Nations." It is probably not too much to say that in no other subject is there a greater scope for originality—of the right kind, of course—than in model aeroplaning. If we admit this statement—and there are few, I think, who would dispute it—then, apart from all else, model aeroplaning, as model aeroplaning only and with no other end in view, can be made a subject of very high educational value, and this without in any way interfering with its enjoyment as a sport and pastime.

As long ago as 1908, Mr. Lanchester stated in the *Engineer* that the problem of flight can be almost entirely solved by means of models. Although we cannot perhaps take these words in their absolute literal sense to-day, models have without a doubt played a by no means unimportant part in the solution of that problem—a problem of which the final solution is, as yet, far from being reached. There are those who hold the opinion that so far as this problem of flight is concerned, models and small scale experiments have had their day. On a future occasion I trust to be able to show that this is by no means the case, founding my conclusions on the only sure basis on which at present such results can be founded—the results of actual experiment.

If those who hold the opinion (and on more than one occasion such a statement has been made to me) "that model

aeroplaning is dying out and that about another year will practically speaking see the end of it" could see the pile of letters, drawings, photos, &c., from all parts of the world, that lie before me as I write, they would certainly be compelled to change their opinion. The rapid and increasing formation of local model clubs is only another proof of this.

Notes.

Two interesting photos received from A. S. Thorne, Krugersdorp, Transvaal, have been spoilt either by insufficient washing after fixing or their sea voyage has disagreed with them—in either case reproduction is impossible.

Will S. Saunders please state inclusive weight of his $\frac{1}{2}$ -h.p. engine with petrol tank and petrol? All weights must be stated and exact dimensions given.

Will C. Hemm (Manchester) kindly send full particulars re his compressed air motor? A photo of the Howard Wright model *alone* would be preferable to the one sent, and one of the same in actual flight most interesting of all.

Will correspondents please note that it is little or no use telling me that they do so and so unless they say *how* they do it; and not write about a model designed for successful flight until it has actually accomplished it, unless they are asking for advice?

A considerable number of photographs of self-made model aeroplanes is already to hand. Exigencies of space forbid the publication of all save, comparatively speaking, a selected few. Naturally, the *clearness* as well as the nature of the photograph must influence the decision. Whenever possible let the background be quite plain. One correspondent, who asks a question relative to his model, encloses a photograph which is so confused with a background of branches and shrubs that it is quite impossible—even with a magnifying glass—to distinguish the part alluded to with sufficient clearness to express an opinion.

Replies in Brief.

Negative Tip.—Consult "Principles of Flight," p. 45.

W. Murray.—We do not think your proposed bracket and bearing for propellers possesses any advantages, rather the reverse. So far as we can judge from the sketch sent it fails to show anything like the minimum of material for the end in view.

H. C. Davis and P. Appleyard.—No form of geared elastic motor is of any use—save for scale models—owing to extra weight and friction.

M. Rogerson.—You are quite correct in your statements.

G. Hewett.—Am I to understand that the original biplane had *neither* elevator nor tail? Please make this clear.

R. E. Jones.—A tractor screw is a propeller placed in *front* of the aeroplane. If you are building, as you say, a scale model Blériot then you must use a tractor, or the model will be incorrect. If you want good flights, then alter your type and have your propeller behind.

Will correspondents kindly attend to these important conditions:—

Write about one subject only in one letter.

Write on one side of the paper only, preferably on foolscap. Write your name and address on every enclosure, including photos and sketches.

Write your questions in the fewest possible words.

Your correspondence is desired.

Address your envelopes "The Editor of FLIGHT (Model Section), 44, St. Martin's Lane, W.C."

CORRESPONDENCE.

* * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which have appeared in **FLIGHT**, would much facilitate ready reference by quoting the number of each letter.

Angleometers.

[1439] Although not in any way directly concerned with aviation, I have always taken a keen interest in its progress, and more particularly in the invention of instruments and appliances assisting towards the safety of aviators in flight.

I have seen it mentioned somewhere, and have always been inquisitive to know, whether any form of instrument has been invented which could indicate to airmen the angle at which they are flying away from the horizontal or off an even keel. Your readers will, no doubt, be able to give me information on this point.

I have always thought that there must be a dangerous angle at which to fly either laterally or in an antero-posterior plane.

Edinburgh.

J. F. V. D. WESTHUIZEN.

"Banking."

[1440] The effect known as "banking," by force of which an aeroplane, steered in a circle, throws its outer wing up and its inner wing down is due to the fact that increase of speed gives an increase of lift.

The terms "outer" and "inner" being understood as meaning "further from" or "nearer to" the centre of the turning circle.

The extremity of the outer wing must obviously travel faster than that of the inner wing while the machine is turning, and the result is that it derives extra lift from its extra speed, and rises relatively to the inner wing.

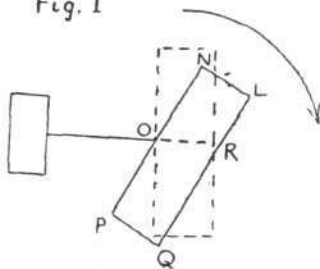
The extent of "banking" depends on the smallness of the turning circle, and the effect of an adverse side puff while "banking" is taking place may be disastrous.

"Banking" is also liable to be accentuated in the case of a sudden turn by the centrifugal force of the principal weights acting outwards on the lower (and inner) end of the outer wing.

As far as models are concerned, I believe it will be found possible to make a model that will travel in a circle without "banking" if the following general principle is observed:—

It will be seen from the diagram, Fig. 1, that if the wing surface of a monoplane be pivoted at the centre of its rear edge, O, and

Fig. 1

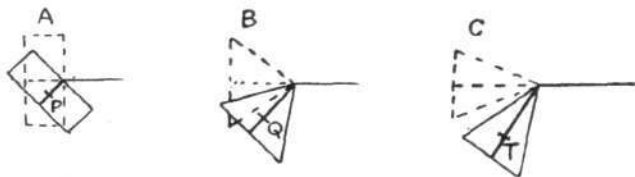


turned, in the plane of the paper, so that the outer wing is advanced in the direction of the turning circle, a power to resist rotation round the body line, O, R, has now been imparted to the machine by the simple fact that the surface, O, P, Q, R, inside the body line is greater than the surface, O, N, L, R, outside that line, and that, therefore, the "banking" lift of the outer wing has been decreased, and the resistance to rotation downwards

of the inner wing increased.

This method of obviating "banking" is, of course, entirely unsuited to full-sized aeroplanes, but I desire to point out that the same effect (of increasing resistance to "banking"), though in minor degree, can be arrived at by pivoting the whole tail surface at its front edge, and allowing it to swing rigidly attached to the vertical rudder, and that the greater the chord length of the tail surface the greater its stabilising effect during a turn will be, as may be seen from the following sketches:—

Thus with the three shapes of tail, A, B and C, it will be seen that the centres of effect of the surfaces, as marked, P, Q and T, will



(owing to the shapes) be at different distances inside the body line for a given turn of the rudder (shown by the centre lines) even though the surfaces be equal in area.

In conclusion, it should be noted that the tail is not being dragged sideways through the air, but is proceeding always in the direction of the rudder line, and its power to check the "banking" rotation

will depend on its area, and on the distance of its centre of effect from the body line, I assume, of course, rigidity of structure.

R. B. FIFE, Major R.G.A.

An Aeroplane "Mascot."

[1441] I thought the enclosed photographs of a model monoplane would be of some interest to readers of **FLIGHT**.

My friend uses it on his motor cycle, and the enclosed photo was taken after having been nearly 500 miles. It has caused much interest in the neighbourhood. The dimensions of same are 1 ft. by 10 ins., built of umbrella wires, sheet tin and brass wire. The wheels are made from clock wheels, with teeth filed off and a strip of tin soldered on and turned up to take tyres, which are rubber umbrella rings. The shock



absorbers are springs from an old trouser clip, square wire skids and brass steering wheel. The tractor is carved from a piece of American white wood and varnished, and flies round when motor is going. It is fitted to a 12-gauge spoke, and runs on brass bearings. There is also a petrol cap fitted made from a valve cap filed down. The whole of the machine is finished in aluminium, and, as you will observe, is fitted to the number plate, making a neat and up-to-date "Mascot." I may tell you this is the ninth model I have made, some of them being very good flyers.

Sherborne.

A. HAMBLIN.

Aeroplane Design.

[1442] Looking through my back numbers of **FLIGHT**, I notice in the issue for June 10th, 1911, in an article describing the new Short biplane, a statement with which I am not exactly in agreement. It is this: "The machine under review reflects modern prejudice in favour of the Farman type biplane, a prejudice which is well founded, for, after all, it is not surprising that pilots should prefer to fly those machines which have proved most successful."

But have they proved most successful? Paulhan, Farman, and Grahame-White, with the aid of Gnome engines, succeeded in bringing the Farman into prominence at a time when aviation was in its infancy, simply because they met with no real opposition, the other few aviators of that time being kept in the background owing to their using engines which were not so satisfactory as the Gnome. It can, therefore, be safely said that the Farman machine owes its success to the Gnome. Several of our best constructors make a speciality of this type, solely because there is a big demand for it, and not because they believe it to be the most efficient. Naturally in the initial stages of flight, if an uninitiated person decided to purchase an aeroplane he bought the machine with the best record without considering that other machines were not so successful owing to engine trouble or minor causes, and not to their actual design. The passing of time, and the fitting of better engines, are bringing out correctly-built aeroplanes into their proper light, and unless Farman and his imitators set to and improve their design they will find themselves left behind in the march of evolution and progress.

ERNEST WARDE-FOX.

The Aeroplane in War.

[1443] I have read with great interest the correspondence and editorials on the above subject, and while agreeing with you that the precise rôle of the aeroplane and dirigible cannot at this date be defined, we should nevertheless have sufficient knowledge of war or the conditions of war to be certain of the following points:—

- (i) That if aeroplanes are used as scouts, every possible means will be taken by the enemy to frustrate their object.
- (ii) That as a means to this end they will be armed for the destruction, where necessary, of the enemy's aeroplanes.
- (iii) That they will, where possible, be used in numbers, or fleets, for the furtherance of this object.
- (iv) Because, before any information worth having can be obtained, they will have to fight and win.
- (v) That dirigibles will only be used when their greater wireless range would give an advantage, i.e., when the distance between the aeroplanes and their base is such that a dirigible from a position in rear of the aeroplane scouts could collect information from them and transmit it in a shorter space of time than it would take the aeroplane to carry it.
- (vi) Or dirigibles may be used for full scout duties against uncivilised or backward nations, such as England is at present.
- (vii) That with the extended fronts of to-day an army would require some thousands of special guns to prevent an aeroplane gaining the information it requires, if no other means were used.

Taking into consideration these seven points and the duty of every scout—gain information, without fighting if possible, but gain information—I think it is fairly clear what we expect of our aerial fleet, when we get it.

To elaborate these seven points may be necessary. No one will doubt the accuracy of the first. The second, taking into consideration the cost of sufficient special guns, and the fact that aeroplanes are not forced to be within range of those we have in use, while the cheaper and more certain method of using aeroplanes for the destruction of aeroplanes gives us the third, for, without cover, unity is strength in scouts as in all other branches, and the scout ends or begins with the fourth. The fifth is a natural conclusion, for they will never be exposed to aeroplane attack if it can be avoided; the sixth may under certain conditions be used with every advantage, in place of the five already mentioned, and the seventh makes the second clear and removes to a certain extent that bogey of special aerial guns, which the Englishman, in view of his backwardness in matters aeronautical, is now looking to for comfort.

There are two or three points which require emphasis. One is although the aeroplane may be a scout, it is a scout without cover of any description and cannot hope to be overlooked. They must, therefore, become scouts in force or they may be destroyed in detail. They would, therefore, be employed in fleets of a sufficiently open order to permit of unity of action without making too large a target; unity of action at high speed requires both organisation and constant practice.

Another point is that if an army or navy be without aeroplane scouts its flanks and rear require equal protection to its front, and if that front be only six miles in extent the number and cost of special guns, or other means employed, would far outweigh the cost of an aeroplane fleet, without giving the same chance of return in the way of information gained.

The main point is that the aeroplane should be armed and the next is to give it the arm best suited to its requirements. The chief of these requirements is undoubtedly the ability to destroy the enemies' aeroplanes, for without the means of doing so it is useless. Even low-speed, well-armed aeroplanes in sufficient numbers would prevent the enemy gaining any useful information and could in turn gain any information they required, where the enemy's aeroplanes are unarmed, or even inefficiently armed. Taking this for granted, and keeping in view the special nature of the target—canvas stretched over a framework of wood and held together by a number of wires—which we must expect to find in the same horizontal plane, or perhaps a higher one than ourselves, the uselessness of any bomb-dropping device should be apparent, even to "R. A." and the sacrifice of weight, therefore, efficiency of our gun, or quantity of ammunition, to enable us to install a bomb tube and bombs, would not be wise. I would here point out

that where it is possible to install a compass, a gun can be relied upon to give a good account of itself in competent hands. It is not denied that a more steady platform would add to the accuracy of the aim, but quite good practice has been made from a torpedo boat destroyer at over 30 miles per hour. What caused our gallant gunner to come to the conclusion that better practice could be made by a bomb-dropping tube than from a gun, on the same unstable platform, for there is nothing to prevent that gun being used as a tube, should occasion necessitate, providing it were capable of sufficient depression. A rifle or Maxim bullet would have to strike a vital part, which after all is a small target compared with the whole of the aeroplane. Therefore I seriously suggested that curiosity, a chain shot, or linked shell. "R. A." will, I think, admit by using such the target is increased in size, from the vital parts to the whole of the aeroplane, and as a gunner he will appreciate its significance, perhaps more so if he considers the natural sequence of arming the aeroplane—its vital parts will be protected against rifle fire.

The small margin of spare lift in any aeroplane will limit the size of the gun and the quantity of ammunition carried. It will, therefore, be of the most efficient type, the type of shell or bullet that can cut away, or cling, and thereby burn the sustainers, is the one most to be feared, for it would have to be a very powerful explosive, seeing we must have so small a shell, to upset the balance or damage the machine otherwise. I am sure "R. A." will not suggest a bomb-dropping device in this connection, for the fight will necessarily be in the same horizontal plane, when the smallest possible target is presented to the enemy. As I endeavoured to point out before, the aeroplane is primarily a scout and a destroyer of scouts, and that "any goods the gods provide" that will not materially assist our scouts to perform these duties are goods of no value to us.

Hassocks.

FRANK W. B. HAMBLING.

Aeronautical Patents Published.

Applied for 11.10.0.
Published November 30th, 1911.

- 25,820. H. J. REICHE. Flying machines.
26,140. J. BOWIE. Aerial propellers.
26,411. VISCOUNT J. DE MONGE. Automatic steadiness of flying machines.
29,032. A. B. LENNOX. Flying machines.

Applied for 11.10.11
Published November 30th, 1911.

- 1,551. E. ROTH. Balloons for airships.
16,708. R. ESNAULT-PELTERIE. Parachute and belt for aviators.

PRINCIPAL CONTENTS.

	PAGE
Editorial Comment	1034
The Government's Great Opportunity. Do it Now!	1035
The Paterson Biplane (with scale drawings)	1035
Forthcoming Discussion on the Military Aeroplane at the Aeronautical Society	1037
A Study of Bird Flight. By Dr. E. H. Hankin, M.A., D.Sc.	1038
From the British Flying Grounds	1041
French Law of the Air	1043
Royal Aero Club Notes	1044
Progress of Flight About the Country	1045
School Aero Club Notes	1047
Science and Gravity	1048
A. Eddies. By "Océan Bleu"	1049
British Notes of the Week	1050
Foreign Aviation News	1050
French Military Competitions	1051
Models. Conducted by V. E. Johnson	1052
Correspondence	1053

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